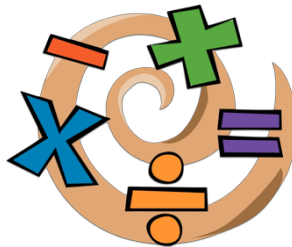




St Andrew's Academy

Mathematics **Department**



COURSE 2 TEXTBOOK

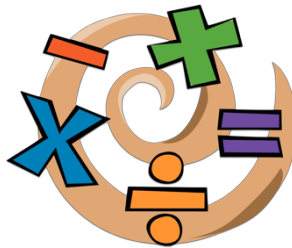
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St Andrew's Academy

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BLOCK FIVE

Number	Algebra	Percentages
<ul style="list-style-type: none">Revision.	<ul style="list-style-type: none">Substitution.Collecting like terms.	<ul style="list-style-type: none">Understanding percentages.Connection between fractions and percentages.Connection between percentages and decimals.Calculating percentages of amounts without a calculator.Calculate percentages using a calculator.Expressing Percentages.

Substitution

Video 20 on www.corbettmaths.com

Examples



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Workout

Question 1: If $a = 7$ $b = 10$ $c = 3$ $d = 8$ and $e = 15$
Find the value of each expression.

- | | | | |
|-------------------|-------------------|-------------------|-------------------|
| (a) $a + 5$ | (b) $b - 4$ | (c) $c + d$ | (d) $e - d$ |
| (e) $2a$ | (f) $4b$ | (g) $3e$ | (h) $5c$ |
| (i) $\frac{b}{2}$ | (j) $\frac{e}{5}$ | (k) $\frac{d}{4}$ | (l) $\frac{a}{2}$ |
| (m) a^2 | (n) b^2 | (o) c^2 | (p) d^2 |
| (q) $2a + 1$ | (r) $3b - 7$ | (s) $9c + 11$ | (t) $4e - 45$ |
| (u) $2a + 3c$ | (v) $4d - b$ | (w) $5a + 2d$ | (x) $e - 4c$ |
| (y) $30 - 4a$ | (z) $15 - 3c$ | | |

Question 2: If $f = 5$ $g = 6$ $h = 4$ and $i = 2$
Find the value of each expression.

- | | | | |
|----------------|---------------|---------------|---------------|
| (a) fg | (b) hi | (c) fgh | (d) i^3 |
| (e) \sqrt{h} | (f) $3f + 2g$ | (g) $5h + 7i$ | (h) $9h - 7i$ |

Question 3: If $a = -2$ $b = 5$ $c = -6$ $d = 10$ and $e = 9$
Find the value of each expression.

- | | | | |
|-------------------|-------------------|----------------|---------------|
| (a) $a + 4$ | (b) $b - 8$ | (c) $c + e$ | (d) $a - d$ |
| (e) $d - c$ | (f) $2c$ | (g) $7a$ | (h) $-7b$ |
| (i) $2d + 3c$ | (j) $6e + 3a$ | (k) $5a + 7$ | (l) $20 + 4a$ |
| (m) ac | (n) $40 - d$ | (o) $2e - a$ | (p) $bd + a$ |
| (q) $\frac{a}{2}$ | (r) $\frac{d}{4}$ | (s) \sqrt{e} | (t) c^2 |

Question 4: If $a = 1.5$ $b = 4$ $c = 6$ $d = 0.5$ and $e = -3$
Find the value of each expression.

- (a) $4(a + d)$ (b) $5(c + b)$ (c) $3(10 - e)$ (d) abc
- (e) e^3 (f) d^2 (g) $5b^2$ (h) $8e^2 + 3$
- (i) $\frac{b+2}{3}$ (j) $\frac{2c-e}{4}$ (k) $\frac{10d+4b}{7}$

Question 5: $P = 2L + 2W$, work out P if $L = 8$ and $W = 3$.

Question 6: $C = 15h + 30$, work out C if $h = 6$.

Apply

Question 1: The cost of hiring a car for a number of days is calculated using the formula

$$\text{Hire Cost} = 30 \times \text{Number of Days} + 50$$



- (a) Calculate the cost of hiring a car for 4 days.
 (b) Calculate the cost of hiring a car for 9 days.
 (c) The hire cost is £110, how many days was the car hired for?
 (d) The hire cost is £380, how many days was the car hired for?

Question 2: The cost of photocopying is given as:

$$\text{Cost in pence} = 3 \times \text{number of black \& white pages} + 15 \times \text{number of colour pages}$$

- (a) Ella orders 20 black & white pages and 6 colour pages, work out the cost.
 (b) Tom orders 400 black & white pages and 70 colour pages, work out the cost.

Question 3: The time in minutes, taken to cook a chicken is given by the formula

$$\text{Time} = 40 \text{ minutes per kilogram plus } 20 \text{ minutes}$$

- (a) Work out the time taken to cook a 5kg chicken.
 (b) Work out the time taken to cook a 2.5kg chicken.



Substitution

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Question 4: This formula is used to calculate the weekly pay of a letting agent.

Weekly pay = basic pay + number of houses rented x bonus

The basic pay is £400 and a bonus of £75 is paid for each house rented.
Mrs Lewis rents out 5 houses in one week.
Calculate her pay.



Question 5: This formula can be used to convert between Celsius and Fahrenheit:

$$F = 1.8C + 32$$

- (a) Work out the value of F when C = 10
- (b) Work out the value of F when C = 20
- (c) Work out the value of F when C = 4
- (d) Work out the value of C when F = 35.6
- (e) Work out the value of C when F = 41
- (f) Work out the value of C when F = 112
- (g) Find a temperature when F and C are the same value.



Answers



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Examples



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Workout

Question 1: Simplify each of the following

- | | | | |
|--------------------------|--------------------------|-----------------------------------|---------------------|
| (a) $y + y + y + y$ | (b) $w + w + w + w + w$ | (c) $a + a + a + a + a + a$ | (d) $s + s + s$ |
| (e) $n + n$ | (f) $g + g + g + g - g$ | (g) $y + y + y + y - y - y$ | (h) $p + p - p - p$ |
| (i) $3y + 2y$ | (j) $4a + 3a$ | (k) $9k + 5k$ | (l) $7m + m$ |
| (m) $15c + 20c$ | (n) $6w - 3w$ | (o) $10y + 3y - 5y$ | (p) $20t - 14t$ |
| (q) $7x - 3x - x$ | (r) $8k - 8k$ | (s) $7y - 2y + y$ | (t) $5u - 4u$ |
| (u) $y^2 + y^2$ | (v) $a^2 + a^2 + a^2$ | (w) $c^2 + c^2 + c^2 + c^2 + c^2$ | (x) $7y^2 + 3y^2$ |
| (y) $2w^2 + 4w^2 + 8w^2$ | (z) $6y^2 - 2y^2 + 3y^2$ | | |

Question 2: Simplify the following expressions

- | | | | |
|--------------------------|--------------------|--------------------|-------------------|
| (a) $4u - 6u$ | (b) $8w - 9w$ | (c) $4a + 2a - 9a$ | (d) $2y - 9y$ |
| (e) $-3g - 2g$ | (f) $-4f + 9f$ | (g) $-m - 7m$ | (h) $5y^2 - 7y^2$ |
| (i) $6a^2 + 2a^2 - 9a^2$ | (j) $ab + ab + ab$ | | |

Question 3: Simplify the following expressions

- | | | |
|-----------------------------|---------------------------|--------------------------------|
| (a) $3a + 2b + 4a + b$ | (b) $7y + 5y + 2h + 2h$ | (c) $g + 8a + 2a + g$ |
| (d) $7m + 7p + 8m + p + 2p$ | (e) $9e + 2 + e + 2$ | (f) $4 + 3a + 2a + 8$ |
| (g) $2y + 4 + 3y - 1$ | (h) $8 + 3w - w - 3$ | (i) $5 - 4s - 2 + 10s$ |
| (j) $3x + 6y + 5x - 2y$ | (k) $6m - 2s + 11s + m$ | (l) $2a + 3b - 2 + a + 3b + 4$ |
| (m) $3a - 2b + a - 5b$ | (n) $2x - 2y - 6x + 5y$ | (o) $y - 4m - 3y - 5m$ |
| (p) $7p - 2q - q + 3r + 4r$ | (q) $11c + 8d - 6c - 11d$ | |

Question 4: Simplify the following

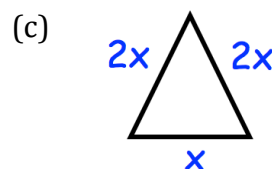
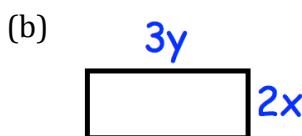
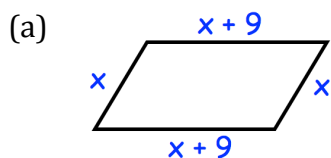
(a) $3y^2 + 4ab + 7y^2 + ab$ (b) $9x^2 - 2x - 11x^2 + 5x$ (c) $7ac - 3ab + 9ab - 7ac$

Question 5: Expand and simplify the following

(a) $2(y + 3) + 3(y + 1)$	(b) $8(x + 2) + 3(x + 3)$	(c) $4(x - 1) + 2(x + 3)$
(d) $5x + 3 + 2(x + 9)$	(e) $3(2y + 1) + 4(2y + 5)$	(f) $5(2x + 3) + 2(3x + 1)$
(g) $7(c + 2) + 3(c - 2)$	(h) $5(2a + 7) + 2(9a - 4)$	(i) $9(t + 3) + 3(2t - 11)$
(j) $2(x - 4) + 5(x - 2)$	(k) $6(y - 1) - 2(y + 3)$	(l) $8(x + 2) - 3(x - 2)$
(m) $5(2y - 3) + 3(y - 2)$	(n) $2(4w - 5) - 2(w - 7)$	(o) $5(3y + 7) - 3(2y - 5)$

Apply

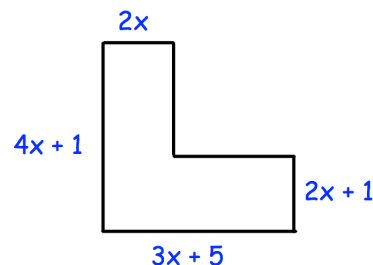
Question 1: Write down the perimeter of each shape below



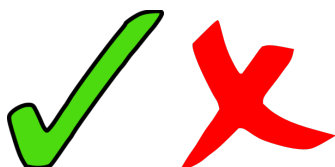
Question 2: A square has a side length of $3x$.
Find an expression for the perimeter of the square.

Question 3: $6x + 7y + x - 8y = 7x - y$
Write down three other expressions that are equal to $7x - y$

Question 4: Find an expression for the perimeter of this shape



Answers



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Examples

Workout



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Question 1: Convert the following decimals to percentages

- | | | | |
|----------|----------|----------|----------|
| (a) 0.25 | (b) 0.75 | (c) 0.13 | (d) 0.88 |
| (e) 0.49 | (f) 0.92 | (g) 0.61 | (h) 0.07 |
| (i) 0.03 | (j) 0.44 | (k) 0.5 | (l) 0.9 |
| (m) 0.72 | (n) 0.8 | (o) 0.01 | (p) 0.36 |

Question 2: Convert the following decimals to percentages

- | | | | |
|-----------|-----------|------------|------------|
| (a) 0.125 | (b) 0.953 | (c) 0.382 | (d) 0.603 |
| (e) 0.075 | (f) 0.021 | (g) 0.1425 | (h) 0.9682 |
| (i) 0.003 | (j) 0.072 | (k) 0.844 | (l) 0.7003 |

Question 3: Convert the following recurring decimals to percentages

- | | | | |
|-----------------|-----------------|------------------------|-------------------------------|
| (a) 0.3333... | (b) 0.6666... | (c) 0.474747... | (d) 0.808080... |
| (e) $0.\dot{8}$ | (f) $0.\dot{1}$ | (g) $0.\dot{5}\dot{2}$ | (h) $0.\dot{1}\dot{2}\dot{3}$ |

Question 4: Convert the following decimals to percentages

- | | | | |
|----------|-----------|----------|-----------|
| (a) 1.63 | (b) 1.25 | (c) 1.8 | (d) 1.01 |
| (e) 2.5 | (f) 2.97 | (g) 3.15 | (h) 3.82 |
| (i) 4.7 | (j) 10.62 | (k) 15.8 | (l) 10.08 |

Apply

Question 1: Match up any decimal and percentage that are equivalent.
Not all the decimals and percentages will match up

40%	0.04
15%	0.3
4%	1.5
150%	0.4
30%	0.9

Question 2: Arrange in order from smallest to largest

(a) 0.4, 20%, 0.5, 45%, 0.09

(b) 0.59, 85%, 20%, 0.8, 13%

(c) 29%, 0.3, 35%, 0.33, 25%

Question 3: Jessica and Daniel are incorrect.
Explain why.

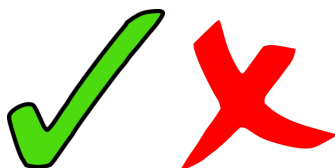
To change a decimal to a percentage, just take away the 0 and the decimal point

You are right!
0.15 is 15%



Question 4: Which is larger, 0.306 or 31%?
Explain your answer.

Answers



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Fractions to Percentages

Video 126 on Corbettmaths

Examples

Workout



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Question 1: Convert the following fractions into percentages.

(a) $\frac{9}{50}$

(b) $\frac{3}{10}$

(c) $\frac{4}{5}$

(d) $\frac{12}{25}$

(e) $\frac{3}{4}$

(f) $\frac{9}{10}$

(g) $\frac{36}{50}$

(h) $\frac{13}{20}$

(i) $\frac{1}{5}$

(j) $\frac{3}{20}$

(k) $\frac{24}{25}$

(l) $\frac{7}{10}$

(m) $\frac{17}{20}$

(n) $\frac{13}{10}$

(o) $\frac{184}{200}$

(p) $\frac{39}{300}$

Question 2: Convert the following fractions into percentages.

(a) $\frac{3}{8}$

(b) $\frac{32}{40}$

(c) $\frac{13}{200}$

(d) $\frac{7}{8}$

(e) $\frac{7}{40}$

(f) $\frac{5}{8}$

(g) $\frac{48}{60}$

(h) $\frac{60}{400}$

(i) $\frac{171}{200}$

(j) $\frac{52}{80}$

(k) $\frac{19}{40}$

(l) $\frac{57}{40}$

Question 3: Convert the following fractions into percentages.

(a) $\frac{1}{8}$

(b) $\frac{17}{40}$

(c) $\frac{5}{16}$

(d) $\frac{53}{400}$

(e) $\frac{38}{125}$

(f) $\frac{15}{16}$

(g) $\frac{7}{32}$

(h) $\frac{10}{64}$

Fractions to Percentages

Video 126 on Corbettmaths

Question 4: Convert the following fractions into percentages.

(a) $\frac{2}{3}$

(b) $\frac{4}{9}$

(c) $\frac{4}{15}$

(d) $\frac{5}{6}$

(e) $\frac{11}{30}$

(f) $\frac{7}{12}$

(g) $\frac{8}{33}$

(h) $\frac{2}{7}$

(i) $\frac{9}{22}$

(j) $\frac{5}{14}$

(k) $\frac{28}{45}$

(l) $\frac{19}{15}$

Apply

Question 1: There are 20 apples on a tree.
3 of the apples are bad.
What percentage of the apples are bad?



Question 2: James sat an English test.
He scored 39 out of 50.
What percentage did he get right?

Question 3: Helen takes 25 shots at basketball training.
She misses 7 shots.
What percentage of the shots did Helen miss?



Question 4: There are 40 passengers on a bus.
14 passengers are going to Newport.
What percentage of the passengers are going to Newport?

Question 5: Randalstown Rugby Club play 8 matches and win 7 of the matches.
What percentage of the matches did Randalstown win?

Question 6: Freddy sits a physics test.
He gets 38 out of 40 correct.
What percentage did he get right?



Question 7: There are 500 students at a school.
141 of the students study Spanish.
What percentage of the students study Spanish?



Question 8: There are 30 students in a class.
4 of the students are left handed.
What percentage of the students are right handed?

Answers



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Examples

Workout



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Question 1: Convert the following fractions to decimals.

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{3}{4}$ (d) $\frac{1}{5}$ (e) $\frac{3}{5}$ (f) $\frac{4}{5}$

(g) $\frac{1}{10}$ (h) $\frac{3}{10}$ (i) $\frac{7}{10}$ (j) $\frac{9}{10}$ (k) $\frac{67}{100}$ (l) $\frac{99}{100}$

Question 2: Convert the following fractions to decimals.

(a) $\frac{1}{8}$ (b) $\frac{7}{20}$ (c) $\frac{5}{8}$ (d) $\frac{3}{20}$ (e) $\frac{3}{25}$ (f) $\frac{7}{8}$

(g) $\frac{19}{20}$ (h) $\frac{43}{50}$ (i) $\frac{1}{3}$ (j) $\frac{9}{200}$ (k) $\frac{9}{40}$ (l) $\frac{13}{20}$

(m) $\frac{2}{3}$ (n) $\frac{123}{200}$ (o) $\frac{21}{40}$ (p) $\frac{401}{500}$ (q) $\frac{161}{200}$ (r) $\frac{3}{8}$

(s) $\frac{1}{9}$ (t) $\frac{19}{50}$ (u) $\frac{51}{80}$ (v) $\frac{11}{80}$ (w) $\frac{5}{9}$

Question 3: Convert the following fractions to decimals.

(a) $\frac{3}{2}$ (b) $\frac{5}{4}$ (c) $\frac{11}{2}$ (d) $\frac{9}{5}$ (e) $\frac{53}{20}$ (f) $\frac{177}{100}$

Apply

Question 1: Match up any fraction and decimal that are equivalent.
Not all the fractions and decimals will match up.

Question 2: Which is larger, 0.65 or $\frac{3}{5}$?
Explain your answer.

Question 3: Arrange in order, from smallest to largest.

$\frac{7}{10}$

0.9

$\frac{4}{5}$

0.77

$\frac{3}{4}$

Question 4: In 2015, $\frac{13}{20}$ of adults in the UK owned a smart phone.
Write $\frac{13}{20}$ as a decimal.

Question 5: Leon has completed his homework.
Can you spot any mistakes?

Write $\frac{4}{5}$ as a decimal.

Write $\frac{3}{20}$ as a decimal.

$$\begin{array}{r} 1.25 \\ 4 \overline{) 5.00} \\ \underline{4 } \\ 10 \\ \underline{8} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

Answer: 1.25

$$\begin{array}{r} 0.105 \\ 20 \overline{) 3.000} \\ \underline{20} \\ 10 \\ \underline{10} \\ 0 \\ \underline{0} \\ 0 \end{array}$$

Answer: 0.105

Answers



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Examples

Workout



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Question 1: Write each of the following percentages as fractions.
If possible, simplify each answer.

- | | | | |
|---------|---------|---------|---------|
| (a) 3% | (b) 14% | (c) 66% | (d) 10% |
| (e) 17% | (f) 30% | (g) 50% | (h) 25% |
| (i) 15% | (j) 29% | (k) 16% | (l) 44% |
| (m) 99% | (n) 85% | (o) 52% | (p) 80% |
| (q) 60% | (r) 20% | (s) 5% | (t) 72% |
| (u) 98% | (v) 2% | (w) 88% | (x) 15% |

Question 2: Write each of the following percentages as fractions.
If possible, simplify each answer.

- | | | | |
|----------|----------|----------|----------|
| (a) 111% | (b) 130% | (c) 150% | (d) 110% |
| (e) 125% | (f) 165% | (g) 160% | (h) 144% |
| (i) 240% | (j) 390% | (k) 358% | (l) 820% |

Question 3: Write each of the following percentages as fractions.
If possible, simplify each answer.

- | | | | |
|-----------|-----------|------------|-----------|
| (a) 12.5% | (b) 0.2% | (c) 1.8% | (d) 15.2% |
| (e) 30.5% | (f) 87.4% | (g) 31.25% | (h) 0.28% |

Apply

Question 1: Match up any fraction and percentage that are equivalent.
Not all the fractions and percentages will match up.

$$\frac{3}{4}$$

30%

$$\frac{3}{10}$$

50%

$$\frac{1}{2}$$

80%

$$\frac{1}{20}$$

25%

$$\frac{4}{5}$$

5%

- Question 2: 10% of the world are left handed.
What fraction of the world are right handed?
- Question 3: 32% of people voted for the Yellow Party in an election.
What fraction of people voted for the Yellow Party?
- Question 4: Rebecca spent 85% of her pocket money this week.
What fraction of her pocket money did she spend?
- Question 5: Neil got 52% of questions correct on a test.
What fraction of questions did he get correct?
- Question 6: In a school, students either study French, German or Spanish.
They study one language each.
11% of students study French
27% of students study Spanish
What fraction of the students study German?



- Question 7: Louis is completing his homework.
Can you spot any mistakes?

Q1

Write 30% as a fraction.
Give your answer in its simplest form.

$$\frac{30}{100} = \frac{15}{50}$$

Q2

Write 6% as a fraction.
Give your answer in its simplest form.

$$\frac{6}{10} = \frac{3}{5}$$

Answers



Click here



Scan here

Examples

Workout



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Question 1: Convert each of the following percentages to decimals

- | | | | |
|---------|---------|---------|---------|
| (a) 53% | (b) 19% | (c) 25% | (d) 74% |
| (e) 65% | (f) 50% | (g) 70% | (h) 10% |
| (i) 90% | (j) 3% | (k) 8% | (l) 5% |
| (m) 57% | (n) 88% | (o) 36% | (p) 99% |

Question 2: Convert each of the following percentages to decimals

- | | | | |
|-------------|------------|------------|------------|
| (a) 15.2% | (b) 23.5% | (c) 90.3% | (d) 62.81% |
| (e) 1.7% | (f) 6.8% | (g) 8.15% | (h) 0.5% |
| (i) 0.49% | (j) 0.03% | (k) 49.68% | (l) 0.598% |
| (m) 64.553% | (n) 80.05% | | |

Question 3: Convert each of the following percentages to decimals

- | | | | |
|------------|------------|-----------|-----------|
| (a) 162% | (b) 190% | (c) 115% | (d) 144% |
| (e) 150% | (f) 212% | (g) 285% | (h) 538% |
| (i) 102.5% | (j) 352.8% | (k) 1047% | (l) 2938% |

Apply

Question 1: Match up any decimal and percentage that are equivalent.
Not all the decimals and percentages will match up.

80%

0.08

25%

0.25

8%

2.5

250%

0.03

30%

0.8

Percentages to Decimals

Video 121 on www.corbettmaths.com

Question 2: Arrange in order from largest to smallest.

(a) 21%, 0.25, 16%, 0.2, 3%

(b) 64%, 0.05, 100%, 0.99, 1.25, 3%

Question 3: James says "1.45 is equal to 145%"

Matt says "that is impossible, you cannot have a percentage greater than 100%"

Who do you agree with? Explain your answer.

Answers



Click here



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Examples

Workout



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Question 1: Convert the following decimals to fractions, in their simplest forms

- | | | | |
|----------|----------|----------|----------|
| (a) 0.5 | (b) 0.3 | (c) 0.7 | (d) 0.1 |
| (e) 0.8 | (f) 0.2 | (g) 0.9 | (h) 0.6 |
| (i) 0.13 | (j) 0.22 | (k) 0.31 | (l) 0.12 |
| (m) 0.42 | (n) 0.89 | (o) 0.15 | (p) 0.84 |
| (q) 0.25 | (r) 0.02 | (s) 0.45 | (t) 0.07 |
| (u) 0.92 | (v) 0.95 | (w) 0.16 | (x) 0.83 |

Question 2: Write the following decimals as fractions, in their simplest forms

- | | | | |
|------------|------------|------------|------------|
| (a) 0.123 | (b) 0.402 | (c) 0.676 | (d) 0.888 |
| (e) 0.195 | (f) 0.625 | (g) 0.225 | (h) 0.1234 |
| (i) 0.5005 | (j) 0.2244 | (k) 0.9702 | (l) 0.7007 |

Question 3: Convert the following decimals to fractions, in their simplest forms

- | | | | |
|----------|----------|----------|----------|
| (a) 1.3 | (b) 1.9 | (c) 1.4 | (d) 1.5 |
| (e) 2.5 | (f) 3.9 | (g) 8.5 | (h) 1.12 |
| (i) 1.75 | (j) 1.72 | (k) 2.75 | (l) 3.55 |

Apply

Question 1: Match up any decimal and fraction that are equivalent.
Not all the decimals and fractions will match up

$$\frac{1}{3}$$

0.6

$$\frac{3}{5}$$

1.3

$$\frac{1}{2}$$

0.5

$$\frac{3}{10}$$

0.625

$$\frac{5}{8}$$

0.3

Question 2: Danny has tried to complete his homework.
Can you spot any mistakes?

Q1

Write 0.6 as a fraction.
Give your answer in its simplest form.

$$\frac{6}{10}$$

Q2

Write 0.08 as a fraction.
Give your answer in its simplest form.

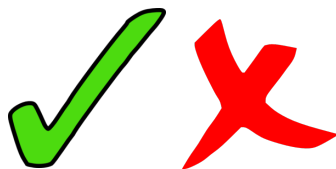
$$\frac{2}{50}$$

Q3

Write 0.902 as a fraction.
Give your answer in its simplest form.

$$\frac{46}{500} = \frac{23}{250}$$

Answers



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Examples

Workout



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Question 1: Write these decimals as percentages

- (a) 0.31 (b) 0.16 (c) 0.22 (d) 0.06 (e) 0.02 (f) 0.8
 (g) 0.4 (h) 0.185 (i) 0.204 (j) 0.092 (k) 1.24 (l) 2.8

Question 2: Write these percentages as decimals

- (a) 18% (b) 27% (c) 60% (d) 3% (e) 55% (f) 80%
 (g) 1% (h) 9.2% (i) 41.5% (j) 0.8% (k) 180% (l) 315%

Question 3: Write these decimals as fractions

- (a) 0.7 (b) 0.4 (c) 0.15 (d) 0.88 (e) 0.79 (f) 0.04
 (g) 0.404 (h) 0.125 (i) 0.625 (j) 0.123 (k) 1.6 (l) 2.25

Question 4: Write these fractions as decimals

- (a) $\frac{3}{10}$ (b) $\frac{3}{5}$ (c) $\frac{81}{100}$ (d) $\frac{9}{20}$ (e) $\frac{1}{8}$ (f) $\frac{19}{40}$
 (g) $\frac{7}{8}$ (h) $\frac{13}{20}$ (i) $\frac{33}{50}$ (j) $\frac{19}{10}$ (k) $\frac{83}{20}$ (l) $\frac{123}{40}$

Question 5: Write these percentages as fractions

- (a) 70% (b) 60% (c) 95% (d) 24% (e) 79% (f) 82%
 (g) 37.5% (h) 1.8% (i) 11.5% (j) 0.06% (k) 160% (l) 285%

Question 6: Write these fractions as percentages

- (a) $\frac{9}{10}$ (b) $\frac{1}{5}$ (c) $\frac{99}{100}$ (d) $\frac{3}{25}$ (e) $\frac{17}{20}$ (f) $\frac{7}{8}$
 (g) $\frac{7}{40}$ (h) $\frac{3}{8}$ (i) $\frac{43}{50}$ (j) $\frac{123}{200}$ (k) $\frac{5}{9}$ (l) $\frac{53}{20}$

Question 6: Which is larger? Show your working out

- (a) 78% or 0.8 (b) $\frac{1}{5}$ or 0.23 (c) $\frac{3}{4}$ or 0.73
- (d) $\frac{17}{20}$ or 0.87 (e) $\frac{5}{8}$ or 0.61 (f) 109% or 1.1
- (g) 43% or $\frac{17}{40}$ (h) $\frac{13}{10}$ or 128% (i) $\frac{5}{2}$ or 2.8

Question 7: Arrange the following in order, from smallest to largest.

- (a) $\frac{1}{4}$ 0.19 0.3 26% $\frac{1}{5}$ (b) 0.9 $\frac{17}{20}$ $\frac{4}{5}$ 88% 0.79
- (c) 11% 0.2 13% $\frac{3}{20}$ $\frac{1}{8}$ (d) $\frac{2}{3}$ 65% 0.68 $\frac{7}{10}$ $\frac{5}{8}$
- (e) 101% $\frac{11}{10}$ 1.2 $\frac{19}{20}$ 0.9 (f) 1.5 $\frac{5}{3}$ 82% $\frac{7}{4}$ $\frac{37}{40}$

Question 8: Copy and complete the tables below

(a)

Fraction	Decimal	Percentage
		10%
$\frac{4}{5}$		
	0.17	
$\frac{3}{20}$		

(b)

Fraction	Decimal	Percentage
	0.11	
$\frac{9}{20}$		
		68%
$\frac{3}{8}$		

(c)

Fraction	Decimal	Percentage
$\frac{2}{3}$		
	0.003	
		10.5%
$\frac{9}{80}$		

(d)

Fraction	Decimal	Percentage
	1.4	
$\frac{19}{10}$		
		265%
$\frac{11}{4}$		

Apply

Question 1: $\frac{3}{5}$ of a fruit punch is orange juice.

What percentage of the fruit punch is orange juice?

Question 2: 18% of a class wear glasses.
What fraction of the class wear glasses?

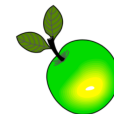
Question 3: Benny says that 0.2 is smaller than 19%.
Is he correct? Explain your answer.



Question 4: Mike got 58% of questions correct on a test.
What fraction of questions did he get correct?

Question 5: A school has three year groups: year 7, year 8 and year 9.
30% of the students are in year 7
36% of the students are in year 8
What fraction of the students at the school are in year 9?

Question 6: In a crate, there are 40 apples.
3 of the apples are bad.
What percentage of apples in the crate are good?



Question 7: James sat an English quiz.
He scored 7 out of 8.
What percentage did he get right?

Question 8: Randalstown Rugby Club play 20 matches and win 17 of the matches.
What percentage of the matches did Randalstown win?



Question 9: Ricky has sat his summer exams.
His scores are below.

(a) Change his scores into percentages.
Give each answer to 1 decimal place.

(b) List Ricky's top 3 subjects

Maths: 17 out of 22
English: 19 out of 30
Science: 51 out of 60
French: 11 out of 12
German: 10 out of 14
Music: 19 out of 42
Geography: 19 out of 28
History: 30 out of 38
Welsh: 65 out of 70

Answers



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Workout

Question 1: Write these fractions as percentages

- (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{3}{4}$ (d) $\frac{1}{5}$ (e) $\frac{3}{5}$ (f) $\frac{7}{10}$ (g) $\frac{1}{3}$

Question 2: Write these fractions as decimals

- (a) $\frac{1}{2}$ (b) $\frac{1}{4}$ (c) $\frac{3}{4}$ (d) $\frac{1}{5}$ (e) $\frac{1}{3}$ (f) $\frac{1}{10}$ (g) $\frac{2}{3}$

Question 3: Write these decimals as fractions

- (a) 0.1 (b) 0.6 (c) 0.5 (d) 0.75 (e) 0.8 (f) 0.2 (g) 0.25

Question 4: Write these decimals as percentages

- (a) 0.75 (b) 0.25 (c) 0.9 (d) 0.5 (e) 0.4 (f) 0.7 (g) 0.8

Question 5: Write these percentages as fractions

- (a) 50% (b) 25% (c) 75% (d) 10% (e) 70% (f) 20% (g) 60%

Question 6: Write these percentages as decimals

- (a) 75% (b) 90% (c) 50% (d) 25% (e) 30% (f) 40% (g) 90%

Question 7: Copy and complete this table

Fraction	Decimal	Percentage
$\frac{1}{2}$		
	0.8	
$\frac{2}{3}$		
		30%

Apply

Question 1: Hannah scored 7 out of 10 in a maths quiz.
What percentage did Hannah get?

Question 2: Write 0.8, 70% and $\frac{3}{4}$ in order, from smallest to largest.

Question 3: Evan answered 60% of the questions correctly in a test.
What percentage did Evan answer incorrectly?

Question 4: James says that $\frac{2}{3} = 66\%$

Explain why James is incorrect.

Question 5: In a school, $\frac{2}{5}$ of the students wear glasses.

(a) What percentage of the students wear glasses?

(b) What fraction of the students **do not** wear glasses?

(c) What percentage of the students **do not** wear glasses?

Question 6: Burt has completed his maths homework.
His answers are in red.
Can you spot any mistakes?

Fraction	Decimal	Percentage
$\frac{1}{2}$	0.5	5%
$\frac{2}{10}$	0.2	20%
$\frac{9}{10}$	0.9	90%
$\frac{1}{3}$	0.33	33%

Percentage of an amount (non-calc)

Video 234 on Corbettmaths

Examples

Workout



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Question 1: Work out the following

- (a) 10% of 70m (b) 25% of 16 seconds (c) 10% of 400kg (d) 50% of 26g
(e) 75% of 40ml (f) 1% of £300 (g) 25% of 36 days (h) 50% of 9 days
(i) 75% of 24p (j) 25% of £18 (k) 1% of \$6300 (l) 10% of £7
(m) 1% of 60m (n) 75% of 8 miles (o) 1% of 80kg (p) 50% of 1.6km

Question 2: Work out the following

- (a) 20% of 30km (b) 5% of £60 (c) 2% of 600m (d) 30% of 70p
(e) 3% of \$9000 (f) 40% of 75 seconds (g) 15% of 90 hours (h) 5% of 14kg
(i) 60% of 30km (j) 30% of £40 (k) 70% of 900cm (l) 20% of 13cm
(m) 11% of 420m (n) 26% of 4000m (o) 55% of £8 (p) 15% of 340kg

Question 3: Work out the following

- (a) 35% of £800 (b) 6% of 160g (c) 23% of 330cm (d) 52% of 910m
(e) 61% of 1400 (f) 7% of 640GB (g) 45% of 350g (h) 80% of 450 people
(i) 90% of 1250ml (j) 76% of £80,000 (k) 85% of 90 hours (l) 12% of £6
(m) 6% of £20 (n) 11% of 6m (o) 28% of 3km (p) 71% of 4 tonnes



Question 4: Calculate the following

- (a) 30% of 245m (b) 5% of 84g (c) 30% of £254 (d) 35% of 82 seconds
(e) 15% of 688kg (f) 45% of 3mm (g) 18% of 25miles (h) 65% of 108ml
(i) 98% of 6m (j) 55% of 18 points (k) 20% of 1.8kg (l) 19% of 705ml
(m) 27% of 84g (n) 63% of 38 seconds (o) 86% of 5km (p) 92% of 80 litres

Percentage of an amount (non-calc)

Video 234 on Corbettmaths

Apply

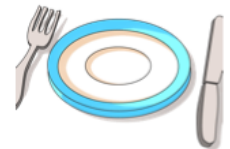
- Question 1: A primary school has 212 students.
50% of the students are boys.
How many of the students are boys?
- Question 2: There are 800 fans at a rugby match between Armagh and Malone.
30% of the fans support Malone.
How many fans support Malone?
- 
- Question 3: Hannah is paid £280.
She spends 30% on her rent, 25% on food and bills and saves the rest.
- (a) How much does Hannah spend on rent?
(b) How much does Hannah spend on food and bills?
(c) How much does Hannah save?
- Question 4: There are 220 students in Year 7.
15% cycle to school.
60% are driven to school.
The rest walk to school.
- (a) How many students cycle to school?
(b) How many students are driven to school?
(c) How many students walk to school?
- Question 5: Fredrick is an estate agent in New York and earns 5% commission on every property sold. How much will he receive if he sells a flat for \$830,000?
- Question 6: A cake weighs 750g.
40% of the cake is sugar.
Work out how many grams of sugar are in the cake.
- 
- Question 7: There are 600 members of a running club.
45% of these members are male.
Work out 45% of 600.
- Question 8: Martin gives 40% of £75 to his sister.
How much money does Martin give to his sister?

Percentage of an amount (non-calc)

Video 234 on Corbettmaths

- Question 9: Emma is paid £24,000 each year.
She is given a pay rise of 12%.
Work out 12% of £24,000.
- Question 10: Mrs Jones donates 4% of her salary each year to charity.
She is paid £32,400.
Work out how much money she donates to charity.
- Question 11: 13% of the people on an island are left handed.
The population of the island is 0.7million.
Work out how many people are left handed.
- Question 12: Frank organised a raffle.
He sells 300 tickets for £5 each.
The prizes cost £400.
He gives 55% of the profit to Charity A and 45% of the profit to Charity B.
Work out how much each charity receives.
- Question 13: Michael is going to buy a car.
The car costs £2400.
He pays a deposit of 20%.
Michael pays the rest of the money over 20 monthly payments.
Work out the cost of each monthly payment.
- Question 14: An adult ticket for a museum is £15.00
A child ticket costs 60% of the price of an adult ticket.
Mrs Jenkins and her three children go to the museum.
Mrs Jenkins pays with three £20 notes.
How much change will she receive?
- Question 15: Frances and her family go for a meal while on holiday in Florida.
They are told it is normal to tip 15%.

The meal costs \$128
Frances tips \$16, is this enough?



Answers



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Percentages of an Amount (Calculator)

Video 235 on www.corbettmaths.com

Examples



Workout

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Question 1: Calculate the following

- (a) 15% of 80ml (b) 9% of 205kg (c) 45% of £135 (d) 17% of 540km
(e) 53% of 700g (f) 14% of 12 hours (g) 31% of 280kg (h) 6% of 4GB
(i) 85% of 1250ml (j) 66% of 9.4 miles (k) 97% of \$54 (l) 13% of 0.5 tonnes

Question 2: Calculate the following

- (a) 2.5% of 60cm (b) 7.2% of 104ml (c) 24.5% of 30m (d) 47.9% of £3200
(e) 0.3% of 44km (f) 85.2% of 6000 marks (g) 0.25% of \$840 (h) 3.175% of 52g

Question 3: Calculate the following

- (a) 109% of 30m (b) 124% of 38 seconds (c) 186% of £40 (d) 196% of 20 miles
(e) 220% of 15g (f) 140.5% of 180kg (g) 371% of £60 (h) 1054% of 70 hours

Apply

Question 1: In year 9, there are 150 students
16% of the students are left handed.



- (a) Work out how many students are left handed.
(b) What percentage of the students are right handed?

Question 2: At a football match, 37% of the fans are children.
There are 12600 fans at the match.

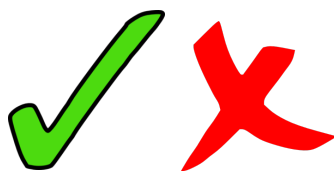
Work out how many children went to the match?

Percentages of an Amount (Calculator)

Video 235 on www.corbettmaths.com

- Question 3: During the last ten years, Donald has played 1200 games of chess.
Donald has drawn 6% of the games.
He has lost 33% of the games.
How many games of chess has Donald won?
- Question 4: Richard owns a coffee shop.
In one week, 68000 drinks are sold.
9% of the drinks sold are hot chocolates.
How many hot chocolates are sold?
- 
- Question 5: Which is larger 20% of 7 or 7% of 20?
- Question 6: Maxwell is paid £460.
He spends 38% on his rent, 13% on his food and 20% on bills.
He saves the rest of the money.
How much money does Maxwell save?
- Question 7: Hannah and Kate each have a salary of £36400.
Hannah is given a pay rise of 4%.
Kate is given £125 extra each month.
Who is given the best pay rise?
- Question 8: There are 80 teachers in a school.
The headteacher says that exactly 89% of the teachers drive to work.
Explain why the headteacher is wrong.
- Question 9: Dorothy organises a charity raffle.
She sells 800 tickets for £2 each.
4% of the tickets win a prize that costs £20.
65% of the profit goes to Charity A and the rest goes to Charity B.
How much money does Dorothy raise for Charity B?
- Question 10: An adult ticket for the cinema costs £12.80
A child ticket is half the price of an adult ticket.
Mr and Mrs Henderson and their six children go to see a movie.
Mrs Henderson has a voucher for 22% off.
How much money does she save?
- 

Answers



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Examples




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Workout

Question 1 


- | | | |
|--------------------------------|--------------------------|--------------------------|
| (a) Increase 20 by 50% | (b) Increase 60p by 10% | (c) Increase 12g by 25% |
| (d) Increase 400 litres by 20% | (e) Increase 32ml by 75% | (f) Increase 70m by 40% |
| (g) Increase 9000 by 5% | (h) Increase £7 by 20% | (i) Increase 9kg by 100% |

Question 2 

- | | | |
|--------------------------|------------------------------|-------------------------|
| (a) Decrease 40 by 10% | (b) Decrease 30 hours by 50% | (c) Decrease 8kg by 25% |
| (d) Decrease 55cm by 40% | (e) Decrease 64 by 75% | (f) Decrease £3 by 10% |
| (g) Decrease 1400 by 30% | (h) Decrease 500g by 3% | (i) Decrease 6kg by 5% |

Question 3 

- | | | |
|---------------------------|----------------------------|-------------------------|
| (a) Increase 80ml by 9% | (b) Increase 420g by 70% | (c) Decrease 8 by 12% |
| (d) Decrease £1250 by 38% | (e) Increase 6000km by 23% | (f) Decrease 48GB by 6% |
| (g) Increase 204 by 98% | (h) Decrease 149mm by 91% | (i) Increase 88 by 185% |

Question 4 

- | | | |
|----------------------------|---------------------------|-------------------------|
| (a) Decrease 90ml by 7.5% | (b) Increase £670 by 1.2% | (c) Increase 3 by 67.4% |
| (d) Increase 750cm by 0.8% | | |

Apply

Question 1: Last year, there was 20 students in a class.



This year, there are 30% more students.
How many students are in the class this year?

Question 2: A TV normally costs £520.
In a sale, all prices are reduced by 10%
Calculate the sale price of the TV



Question 3: Over the past 10 years, the population of a town has increased by 25%
The population of the town 10 years ago was 18000
What is the population of the town now?



Question 4: A standard bag of flour contains 600g of flour.
A special edition bag contains 35% more flour.
How much flour is in the special edition bag?



Question 5: Richard owns a coffee shop.
In February, 4500 hot chocolates were sold.
The number of hot chocolates sold in March was 3% less.
How many hot chocolates are sold in March?



Question 6: Gabriel's salary is £24500.
Next year he is due to get a 9% increase.
What will his new salary be?



Question 7: Iris spends £40 a month on water.
By changing company, Iris can save 16%.
How much would Iris pay each month?



Question 8: An empty flowerpot has a mass of 800g.
The mass of the flowerpot increases to 4kg when filled with soil.
A different flowerpot is 25% lighter but holds 40% more soil.
Calculate the mass of this flowerpot when it is full of soil.



Increasing/Decreasing by a Percentage

Video 238 on www.corbettmaths.com

Question 9: Louis sees this special offer in a shop.



Louis buys both items.
How much does he pay?

Special Offer

iPad £489

Case £55

Buy both items and receive a 3% discount

Question 10: An adult ticket for the cinema costs £13.40
A child ticket is half the price of an adult ticket.
Mr and Mrs Henderson and their six children go to see a movie.
Mrs Henderson has a voucher for 18% off.
Work out how much Mrs Henderson pays for the tickets.



Question 11: Zara wants to buy 72 candles.
Each candle costs £4.80



There is a special offer

Special Offer

Candles £4.80 each

Buy 60 or more candles and
get 15% off the total cost.

Work out the cost of buying 72 candles
using the special offer.

Question 12: When a tennis ball is dropped, it bounces and then rises.
The ball rises to 80% of the height from which it is dropped.
The ball is dropped from a height of 4 metres.

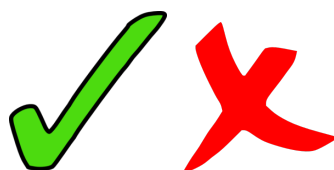


- (a) Calculate the height of the rise after the first bounce.
- (b) Calculate the height of the rise after the second bounce.

The ball carries on bouncing, each time rising to 80% of the last rise.

- (c) For how many bounces does the ball rise to a height greater than 10cm?

Answers



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Examples



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Workout

Question 1:

- | | |
|---|---|
| (a) Write £5 as a percentage of £10 | (b) Write 5cm as a percentage of 20cm |
| (c) Write 7 days as a percentage of 10 days | (d) Write 27 as a percentage of 50 |
| (e) Write 3g as a percentage of 20g | (f) Write 4m as a percentage of 5m |
| (g) Write 164 as a percentage of 200 | (h) Write 130ml as a percentage of 1000ml |

Question 2:

- | | |
|--|--|
| (a) Write 6 out of 8 marks as a percentage | (b) Write 10kg as a percentage of 40kg |
| (c) Write 22 as a percentage of 40 | (d) Write \$15 as a percentage of \$75 |
| (e) Write £21 as a percentage of £30 | (f) Write €18 as a percentage of €40 |
| (g) Write 20p as a percentage of £1 | (h) Write 60cm as a percentage of 2m |

Question 3:




- | | |
|--|---|
| (a) Write 3 as a percentage of 8 | (b) Write 13 out of 200 as a percentage |
| (c) Write 7cm as a percentage of 40cm | (d) Write \$5 as a percentage of \$16 |
| (e) Write 19 marks out of 32 as a percentage | (f) Write 20 out of 30 as a percentage |


Question 4: Give each answer to 1 decimal place

- | | |
|--|--|
| (a) Write 8 as a percentage of 18 | (b) Write £1000 as a percentage of £1200 |
| (c) Write 128 as a percentage of 153 | (d) Write 5 hours as a percentage of 1 day |
| (e) Write 394000 people as a percentage of 2490000 | |

Apply

- Question 1: Kristina receives £5 from her Grandmother.
She gives £1 to her sister.
What percentage of the £5 did she give to her sister?
- Question 2: For every 50 fans at an ice hockey match between Belfast and Cardiff,
20 of the fans support Cardiff.
(a) Work out 20 as a percentage of 50.

1000 fans attend the match between Belfast and Cardiff.
(b) How many Cardiff fans attend the match?
- Question 3: Danny scored 13 out of 20 in a quiz.  
(a) Work out the percentage of questions Danny answered correctly.
(b) Work out the percentage of questions Danny answered incorrectly.
- Question 4: Jake brings 400 cupcakes to a school fête.
He sells 350 of the cupcakes.
Jake says that he has sold over 85% of the cupcakes. 

Is Jake correct?
- Question 5: A cereal bar weighs 24g.
The cereal bar contains 3.8g of protein.
Work out what percentage of the cereal bar is protein.
- Question 6: Hannah scored 60 out of 90 in a French test.
She scored 50 out of 80 in a drama test.
Hannah scored 85 out of 130 in an art test.
She scored 13 out of 20 in a maths test.
Arrange the subject in order from the highest percentage to lowest percentage.
- Question 7: Bryan and Ryan are buying a car that costs £15000.
Bryan pays a deposit of £2000
Ryan pays a deposit that is 40% more than Bryan's deposit.
Work out the percentage of total cost that is left to pay. 

Expressing as a Percentage

Video 237 on www.corbettmaths.com

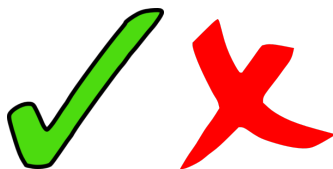
Question 8: 370 students attend a primary school.
Mrs Jones says that at least 95% of students attended the school every day.

Mon	Tues	Wed	Thurs	Fri
360	355	352	347	357

Is Mrs Jones correct?

Question 9: The population of a town is 4.52×10^4
The number of people that own a goldfish is 1.34×10^3
Calculate the percentage of the population that own a goldfish.

Answers



Click here

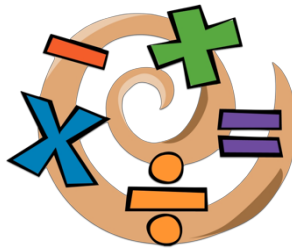


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St Andrew's Academy

Mathematics Department



BLOCK SIX

Number	Algebra	Time
<ul style="list-style-type: none">• Long Multiplication.• Long Division.• Division with remainders.	<ul style="list-style-type: none">• Using Inequalities.• Solving Inequalities.• Expanding binomials.• Squaring binomials.	<ul style="list-style-type: none">• Know basic time facts.• Read and write times from clocks.• Understand and use 12 hour and 24-hour time.• Calculate time intervals.• Convert hours and minutes into decimals.• Speed, distance and time calculations.

Examples

Workout



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Question 1: Work out the following multiplications

- | | | | |
|--------------------|--------------------|--------------------|--------------------|
| (a) 14×13 | (b) 23×12 | (c) 35×13 | (d) 19×15 |
| (e) 17×17 | (f) 34×23 | (g) 19×32 | (h) 48×16 |
| (i) 53×27 | (j) 44×25 | (k) 57×30 | (l) 62×16 |

Question 2: Work out the following multiplications

- | | | | |
|--------------------|--------------------|--------------------|--------------------|
| (a) 48×47 | (b) 65×78 | (c) 83×56 | (d) 74×86 |
| (e) 92×66 | (f) 73×89 | (g) 94×84 | (h) 97×69 |
| (i) 78×93 | (j) 88×88 | (k) 96×92 | (l) 76×67 |

Question 3: Work out the following multiplications

- | | | | |
|---------------------|---------------------|---------------------|---------------------|
| (a) 142×13 | (b) 127×15 | (c) 133×12 | (d) 186×11 |
| (e) 158×24 | (f) 193×25 | (g) 108×17 | (h) 170×23 |
| (i) 324×19 | (j) 405×15 | (k) 522×34 | (l) 604×28 |

Question 4: Work out the following multiplications

- | | | | |
|---------------------|---------------------|---------------------|---------------------|
| (a) 783×55 | (b) 924×46 | (c) 888×64 | (d) 606×94 |
| (e) 811×97 | (f) 777×66 | (g) 890×83 | (h) 952×74 |
| (i) 939×84 | (j) 686×58 | (k) 660×98 | (l) 968×79 |

Question 5: Work out the following multiplications

- | | | | |
|----------------------|----------------------|----------------------|----------------------|
| (a) 135×122 | (b) 142×104 | (c) 144×113 | (d) 205×147 |
| (e) 240×108 | (f) 216×156 | (g) 317×223 | (h) 562×275 |
| (i) 617×392 | (j) 384×256 | (k) 687×749 | (l) 983×991 |

Apply

- Question 1: There are 12 cupcakes in a box.
Dara is organising a party and wants 200 cupcakes.
He buys 16 boxes.
Does Dara have enough cupcakes?



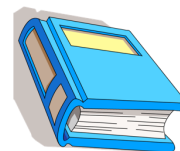
- Question 2: Find the product of 62 and 51

- Question 3: A rugby team brought 18 coaches of supporters to a cup match.
Each coach holds 53 passengers.



How many supporters are brought to the cup match by the 18 coaches?

- Question 4: Felicity spends 25 minutes reading every day.
How long does she spend reading during the month of May?



- Question 5: A cinema has 26 seats in each row.
There are 18 rows.
During a showing of movie, there are 70 empty seats.



Work out how many people watch the movie.

- Question 6: Miss Jenkins owns an electronics shop.
She order 27 laptops at £413 each.
Miss Jenkins sells the 27 laptops for £600 each.

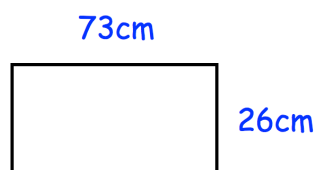
Work out the profit.

- Question 7: How many hours are there in one leap year?



- Question 8: A ruler costs 49p.
Work out the cost of 125 rulers.
Give your answer in pounds.

- Question 9: Find the area of this rectangle



Multiplication 2

Videos 199 and 200 on www.corbettmaths.com

Question 10: (a) Work out the following multiplications

$$\begin{aligned}1 \times 1 \\ 11 \times 11 \\ 111 \times 111 \\ 1111 \times 1111\end{aligned}$$

- (b) Predict the answer to 11111×11111
(c) Predict the answer to 11111111×11111111
(d) When will the pattern end?

Question 11: Jenny bought a motorbike.

She paid a deposit of £345 and 36 monthly payments of £44
At the end of the payments, she sold the motorbike for £1400.



How much did it cost Jenny in total?

Question 12: (a) Choose any two digit number and multiply it by 13

- (b) Multiply your answer by 7
(c) Finally multiply your new answer by 11
(d) What do you notice?
Can you explain why?

Question 13: Kyle is organising a charity concert at school.

The concert is sold out.
The halls holds 35 rows of 42 seats.
Each person will pay £7
How much money will Kyle raise for charity?



Question 14: Two whole numbers multiply together to give an answer of 600.

Neither of the numbers contain the digit zero.
What are the two numbers?

Question 15: Martina has 24 crates of oranges.

Each crate weighs 37.3kg.
Martina's van can hold up to 900kg.
Will the van be able to carry all 24 crates?



Answers



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Division

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Examples



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Workout

Question 1: Work out the answers to the following divisions

- | | | | |
|-----------------|-----------------|-----------------|-----------------|
| (a) $84 \div 4$ | (b) $52 \div 2$ | (c) $72 \div 3$ | (d) $75 \div 5$ |
| (e) $54 \div 3$ | (f) $68 \div 4$ | (g) $90 \div 5$ | (h) $84 \div 6$ |
| (i) $91 \div 7$ | (j) $81 \div 3$ | (k) $87 \div 3$ | (l) $92 \div 4$ |

Question 2: Work out the answers to the following divisions

- | | | | |
|------------------|------------------|------------------|------------------|
| (a) $236 \div 2$ | (b) $156 \div 3$ | (c) $108 \div 4$ | (d) $235 \div 5$ |
| (e) $260 \div 4$ | (f) $222 \div 3$ | (g) $545 \div 5$ | (h) $312 \div 6$ |
| (i) $438 \div 6$ | (j) $171 \div 9$ | (k) $584 \div 8$ | (l) $553 \div 7$ |
| (m) $981 \div 9$ | (n) $856 \div 4$ | (o) $801 \div 9$ | (p) $406 \div 7$ |

Question 3: Work out the answers to the following divisions

- | | | | |
|-------------------|-------------------|--------------------|--------------------|
| (a) $2735 \div 5$ | (b) $3312 \div 4$ | (c) $2664 \div 3$ | (d) $6540 \div 5$ |
| (e) $3360 \div 7$ | (f) $4902 \div 6$ | (g) $7128 \div 9$ | (h) $9020 \div 5$ |
| (i) $8208 \div 8$ | (j) $7500 \div 6$ | (k) $15462 \div 3$ | (l) $24353 \div 7$ |

Question 4: Work out each of the following

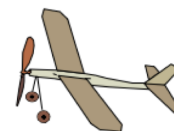
- | | | | |
|--------------------|---------------------|--------------------|--------------------|
| (a) $154 \div 11$ | (b) $192 \div 12$ | (c) $195 \div 13$ | (d) $345 \div 15$ |
| (e) $374 \div 22$ | (f) $416 \div 16$ | (g) $385 \div 11$ | (h) $648 \div 12$ |
| (i) $1150 \div 25$ | (j) $805 \div 35$ | (k) $1196 \div 52$ | (l) $630 \div 18$ |
| (m) $5580 \div 90$ | (n) $2520 \div 105$ | (o) $1755 \div 65$ | (p) $2904 \div 33$ |

Question 5: Work out each of the following.
Give each answer as a decimal.

- (a) $82 \div 4$ (b) $75 \div 6$ (c) $12 \div 5$ (d) $4 \div 5$
(e) $88 \div 5$ (f) $118 \div 8$ (g) $174 \div 12$ (h) $745 \div 20$
(i) $3406 \div 8$ (j) $4268 \div 6$ (k) $8519 \div 14$ (l) $1854 \div 24$

Apply

Question 1: A toy costs £6.
Over a week, a shop makes £162 from selling the toy.
How many toys were sold?



Question 2: A group of 3 friends take a journey in a taxi.
The total cost of the journey is £72.
The friends share the cost equally.
How much does each person pay?



Question 3: A bookshelf in a classroom is 112cm long.
A teacher has 30 mathematics textbooks, each 4cm wide.



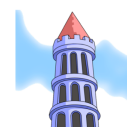
- (a) Can the teacher place all 30 textbooks on the shelf?
(b) What is the maximum number of textbooks that will fit on the shelf?

Question 4: A journey lasts 119 days.
How many weeks is this?

Question 5: Sally is paid £8 per hour.
In one week she is paid £264.
How many hours did Sally work?

Question 6: A school has 5 year groups and 835 students in total.
Each year group has an equal number of students.
How many students are in each year group?

Question 7: A group of 9 friends go on a coach tour.
The total cost for the tour is £648.
Work out the cost per person.



Question 8: The product of Jack's age and Florence's age is 266.
Jack is 14 years old.
How old is Florence?

Question 9: At a conference there are 621 people.
Each table seats 8 people.
How many tables are needed?

Question 10: Daisy is buying rulers.
She has £10.
Each ruler costs 74p
Daisy buys as many rulers as she can.

- (a) How many rulers does Daisy buy?
(b) How much change should Daisy receive?

Question 11: Miss Jenkins has 18 bags of sweets.
Each bag contains 30 sweets.
Miss Jenkins shares as many sweets as possible equally among the 16 students in her class.



- (a) How many sweets does each student receive?
(b) How many sweets are left over?

Question 12: Harry hires a car from Holiday Cars for 3 days.
His total bill was £204.
How many miles did Harry drive?

Holiday Cars

£45 per day
20p per mile

Question 13: Leah bought a new car costing £18,000
She paid a deposit of £2,000.
Leah paid the rest of the money over 50 equal monthly payments.
How much was each monthly payment?

Question 14: James hired a holiday cottage for 7 days for £406
Ben hires the same cottage, at the same price per day, for 10 days.
How much will this cost Ben?

Question 15: The product of three numbers is 1001.
The first two numbers are 7 and 11.
What is the third number?

Question 16: There are 1560 sweets in a tub.
Katherine and her friends share the sweets equally.
Each person receives 65 sweets.
How many friends does Katherine have?

Question 17: A theatre has 28 seats in each row.
There are 1036 seats in total.
How many rows are there?

Answers



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Examples

Workout



Click here



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Question 1: Work out the remainder for each of the following divisions.

- | | | | | |
|------------------|------------------|------------------|-------------------|------------------|
| (a) $17 \div 2$ | (b) $23 \div 5$ | (c) $14 \div 3$ | (d) $19 \div 4$ | (e) $14 \div 2$ |
| (f) $26 \div 6$ | (g) $45 \div 10$ | (h) $31 \div 7$ | (i) $12 \div 9$ | (j) $30 \div 8$ |
| (k) $40 \div 11$ | (l) $52 \div 8$ | (m) $49 \div 5$ | (n) $66 \div 9$ | (o) $80 \div 7$ |
| (p) $102 \div 5$ | (q) $79 \div 3$ | (r) $139 \div 4$ | (s) $283 \div 10$ | (t) $90 \div 12$ |

Question 2: Work out the remainder for each of the following divisions.

- | | | | |
|-------------------|-------------------|-------------------|-------------------|
| (a) $326 \div 7$ | (b) $776 \div 3$ | (c) $359 \div 6$ | (d) $232 \div 8$ |
| (e) $400 \div 12$ | (f) $452 \div 15$ | (g) $377 \div 16$ | (h) $283 \div 11$ |

Question 3: Work out the following divisions.
Give each answer as a decimal number. e.g. $13 \div 2 = 6.5$

- | | | | | |
|-------------------|--------------------|--------------------|-------------------|------------------|
| (a) $7 \div 2$ | (b) $9 \div 5$ | (c) $43 \div 2$ | (d) $27 \div 5$ | (e) $86 \div 5$ |
| (f) $56 \div 10$ | (g) $14 \div 4$ | (h) $66 \div 4$ | (i) $51 \div 6$ | (j) $41 \div 4$ |
| (k) $75 \div 4$ | (l) $26 \div 8$ | (m) $38 \div 8$ | (n) $40 \div 3$ | (o) $29 \div 3$ |
| (p) $123 \div 15$ | (q) $111 \div 12$ | (r) $300 \div 9$ | (s) $748 \div 20$ | (t) $253 \div 6$ |
| (u) $853 \div 40$ | (v) $1879 \div 20$ | (w) $8161 \div 80$ | | |

Question 4: Work out the following divisions.
Give each answer as a mixed number and simplify any fraction. e.g. $14 \div 3 = 4\frac{2}{3}$

- | | | | | |
|-------------------|-------------------|-------------------|-------------------|-----------------|
| (a) $11 \div 2$ | (b) $38 \div 3$ | (c) $11 \div 6$ | (d) $43 \div 10$ | (e) $21 \div 5$ |
| (f) $54 \div 10$ | (g) $50 \div 8$ | (h) $45 \div 7$ | (i) $78 \div 5$ | (j) $99 \div 4$ |
| (k) $155 \div 6$ | (l) $290 \div 11$ | (m) $481 \div 12$ | (n) $324 \div 5$ | (o) $83 \div 9$ |
| (p) $384 \div 15$ | (q) $772 \div 10$ | (r) $358 \div 20$ | (s) $475 \div 40$ | |

Apply

Question 1: Simon is sharing 27 marbles equally between 4 friends.
How many marbles are left over?

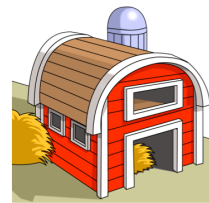


Question 2: Rebecca is selling raffle tickets in booklets of 5.
She has 86 raffle tickets.

- (a) How many booklets can Rebecca sell?
- (b) How many tickets will be left over?

Question 3: Eggs are being packed into boxes of 6.
Farmer Richards has 77 eggs.

- (a) How many boxes can he fill?
- (b) How many eggs will be left over?



Question 4: At a wedding there are 125 guests.
8 people can sit at each table.
All the tables are filled, except one.
How many guests sit at the table that is not filled?

Question 5: Burt is making cupcakes.
He places the cupcakes in boxes of 12.
Burt has 200 cupcakes.
How many boxes can he fill?



Question 6: Five friends share £13.
How much do they receive each?

Question 7: The perimeter of a square is 171cm
Find the length of each side.

Question 8: Michael is saving for a holiday.
The holiday will cost him £885.
He will save money for one year.
Michael will save an equal amount each month to pay for the holiday.
How much should he save each month?



Answers



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Workout

Question 1: Write out the following with either an $<$ or $>$ symbol

- (a) $8 \square 6$ (b) $2 \square 3$ (c) $7 \square 10$ (d) $5 \square 0$
 (e) $4 \square -1$ (f) $-4 \square 6$ (g) $9 \square 9.4$ (h) $0 \square -1$

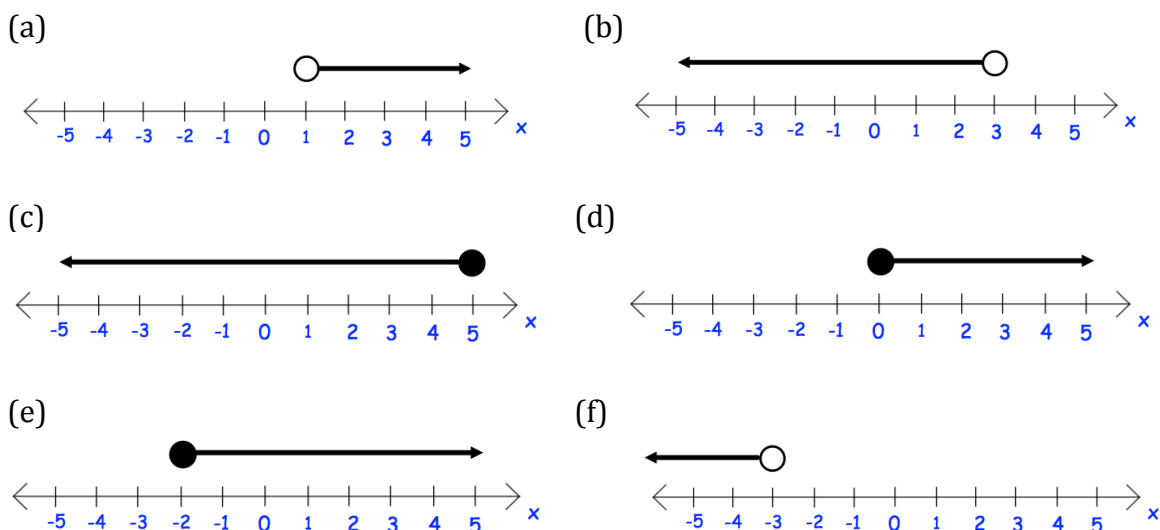
Question 2: Write down an inequality for each of the following

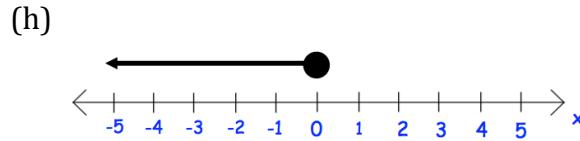
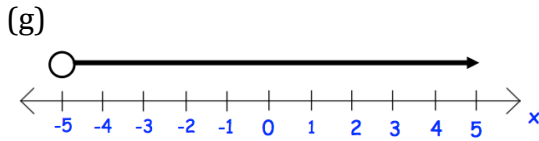
- (a) x is greater than 8 (b) x is less than 3
 (c) x is less than or equal to 1 (d) x is greater than or equal to 0
 (e) x is less than 7 (f) x is greater than or equal to -2
 (g) x is less than or equal to -10 (h) x is greater than 5

Question 3: Write down the meaning of these inequalities

- (a) $x > 6$ (b) $x < 2$ (c) $x \geq 1$ (d) $x \leq 4$
 (e) $x \geq 0$ (f) $x \leq -4$ (g) $x < -2$ (h) $x > 20$
 (i) $x < y$ (j) $a \geq b$ (k) $c > 5$ (l) $y \leq 100$

Question 4: Write down the inequalities shown below





Question 5: Show these inequalities on a number line.

- | | | | |
|-----------------|-----------------|----------------|----------------|
| (a) $x > 2$ | (b) $x < 4$ | (c) $x \geq 3$ | (d) $x \leq 5$ |
| (e) $x \geq 0$ | (f) $x \leq -1$ | (g) $x < -4$ | (h) $x > -5$ |
| (i) $x \geq -6$ | (f) $x > 0$ | (g) $x < -2$ | (h) $x > -1$ |

Question 6: Write down an inequality for each of the following

- x is greater than 2, but less than 5
- x is greater than 0, but less than 4
- x is greater than 1, but less than or equal to 7
- x is greater than -5, but less than or equal to 2
- x is greater than or equal to -8, but less than 3
- x is greater than or equal to 10, but less than 20
- x is greater than or equal to 3, but less than or equal to 6
- x is greater than or equal to 8, but less than or equal to 11

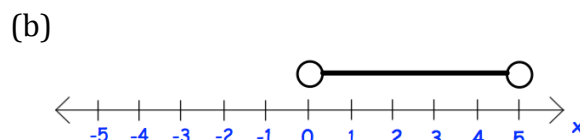
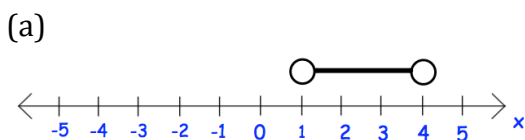
Question 7: Write down the meaning of these inequalities

- | | | | |
|--------------------|---------------------|-------------------------|------------------------|
| (a) $3 < x < 5$ | (b) $2 < x < 9$ | (c) $19 \leq x < 20$ | (d) $5 \leq x \leq 10$ |
| (e) $0 < x \leq 4$ | (f) $-4 \leq x < 1$ | (g) $-8 \leq x \leq -6$ | (h) $100 < x < 200$ |

Question 8: List all the integers (whole number) that satisfies each inequality

- | | | | |
|---------------------|---------------------|--------------------------|-------------------------|
| (a) $2 < x < 6$ | (b) $5 < x < 10$ | (c) $4 \leq x < 8$ | (d) $12 \leq x \leq 15$ |
| (e) $-2 < x \leq 3$ | (f) $-5 \leq x < 1$ | (g) $-10 \leq x \leq -5$ | (h) $-4 < x < 4$ |

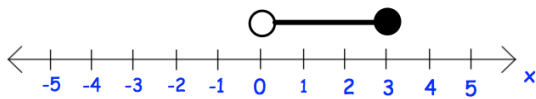
Question 9: Write down the inequalities shown below



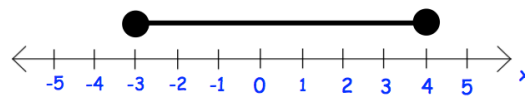
Inequalities

Videos 176, 177 on Corbettmaths

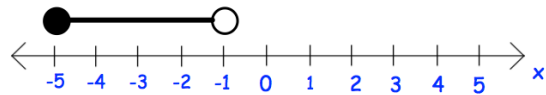
(c)



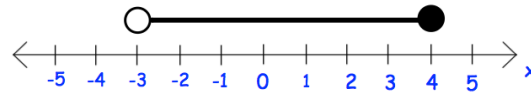
(d)



(e)



(f)



Apply

Question 1: The cost, c , of a TV is less than £300. Write this as an inequality.

Question 2: To go on a rollercoaster, a person's height, h , must be over 140cm. Write this as an inequality.

Question 3: The value of a house, v , is £100,000 or over. Write this as an inequality.



Question 4: There are 20 students in a class. The number of students present on a particular day is 20 or less. Write this as an inequality.

Question 5: Write down any integers (whole numbers) that satisfies **both** $x > 4$ and $x \leq 8$

Question 6: Write down any integers (whole numbers) that satisfies **both** $2 < x \leq 9$ and $x > 5$

Workout

Question 1: Solve each of the inequalities below

(a) $x + 4 > 9$ (b) $x - 3 < 2$ (c) $2x \leq 14$ (d) $8x < 16$

(e) $5x \geq 15$ (f) $\frac{x}{3} > 4$ (g) $\frac{x}{5} \leq 2$ (h) $x + 6 \geq 4$

Question 2: Solve each of the inequalities below

(a) $2x + 1 \leq 9$ (b) $3x - 5 > 16$ (c) $4x + 8 < 32$ (d) $5x - 2 \geq 68$

(e) $\frac{x}{2} + 1 \leq 5$ (f) $\frac{x}{9} - 6 > 4$ (g) $\frac{x+3}{2} \geq 5$ (h) $\frac{x-5}{4} > 2$

Question 3: Solve each inequality below and represent the solution on a number line.

(a) $4x + 7 < 11$ (b) $3x - 2 \geq 10$ (c) $\frac{x}{2} - 3 > 0$ (d) $\frac{x+18}{4} \leq 5$

Question 4: Solve each of the inequalities below

(a) $5(x - 3) \geq 40$ (b) $6(x + 2) < 42$ (c) $2(5x + 1) \leq 36$

(d) $4(x - 2) < 18$ (e) $2(2x - 9) \geq 22$ (f) $3(2x + 7) \leq 9$

Question 5: Solve each of the inequalities below

(a) $4x + 3 > 2x + 11$ (b) $x + 1 \geq 3x - 18$

(c) $13x - 12 < 3x + 13$ (d) $7x - 5 \geq 3x + 11$

Question 6: Find the largest integer that satisfies each inequality below.

(a) $x + 3 < 9$ (b) $2x + 5 < 12$ (c) $7x + 10 \leq 31$

(d) $3x - 5 \leq 9$ (e) $\frac{x}{4} + 3 \leq 8$ (f) $4x + 14 \leq 8$

Question 6: Find the smallest integer that satisfies each inequality below.

- (a) $2x - 5 \geq 12$ (b) $4x > 9$ (c) $\frac{x+9}{3} \geq 7$
- (d) $7x + 1 > 60$ (e) $10x - 16 \geq 76$ (f) $9x + 4 > 7x + 15$

Question 7: Solve each of the inequalities below

- (a) $6 < x + 3 < 10$ (b) $4 \leq 2x \leq 7$ (c) $1 \leq 3x < 9$
- (d) $4 < \frac{x}{5} < 6$ (e) $9 \leq 2x + 3 \leq 25$ (f) $-3 \leq \frac{x}{4} - 1 < 0$

Question 8: Find the integers that satisfy each of the inequalities below

- (a) $5 < x < 9$ (b) $-3 < x \leq 1$ (c) $4 \leq 2x \leq 8$
- (d) $16 \leq 5x + 1 < 31$ (e) $0 \leq \frac{x-6}{2} < 2$ (f) $-9 < \frac{x}{4} - 1 < -8$

Apply

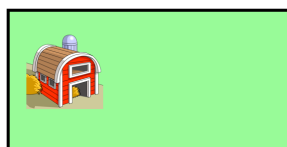
Question 1: Lauren goes shopping and has £50 to spend.
She bought a T-shirt and 3 pairs of leggings.
The T-shirt cost £23.
Each pair of leggings cost £x

- (a) Form an inequality in terms of x.
(b) Solve the inequality to find the possible price of the leggings.

Question 2: Farmer Taylor is placing a fence around his field.
He has 300 metres of fencing but this is not enough.

- (a) Form an inequality in terms of x.
(b) Solve the inequality to find the possible width of the field.

2x + 5 metres



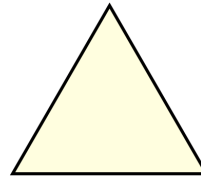
x metres

Solving Inequalities

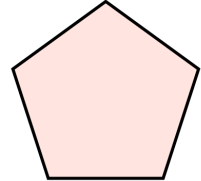
Videos 178 and 179 on www.corbettmaths.com

Question 3: The perimeter of the regular pentagon is larger than the perimeter of the equilateral triangle.

- (a) Form an inequality in terms of x
- (b) Solve the inequality to find the possible range of values for x .



$$x + 6$$



$$x + 2$$

Question 4: Find the range of values of x that satisfies **both**

$$3(x + 2) \leq 30 \quad \text{and} \quad 4x + 3 > 21$$

Question 5: y is a prime number and also satisfies $7 < 2y - 3 \leq 25$

List the possible values of y .

Examples



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Workout

Question 1: Expand and simplify

- (a) $(w + 4)(w + 2)$ (b) $(y + 1)(y + 2)$ (c) $(c + 2)(c + 5)$ (d) $(x + 6)(x + 7)$
(e) $(a + 5)(a - 3)$ (f) $(g + 7)(g - 4)$ (g) $(s - 4)(s + 5)$ (h) $(x + 1)(x - 3)$
(i) $(p - 3)(p - 2)$ (j) $(y - 4)(y - 4)$ (k) $(k - 5)(k - 6)$ (l) $(v + 4)(v + 3)$
(m) $(n + 8)(n - 10)$ (n) $(b - 3)(b + 7)$ (o) $(z - 9)(z - 3)$ (p) $(a - 5)(a + 7)$
(q) $(w + 2)(w - 8)$ (r) $(r + 7)(r + 7)$ (s) $(w - 11)(w + 1)$ (t) $(t - 8)(t - 7)$

Question 2: Expand and simplify

- (a) $(8 + x)(2 + x)$ (b) $(9 + y)(4 - y)$ (c) $(1 + y)(3 + y)$ (d) $(10 - t)(4 - t)$
(e) $(4 - w)(w + 2)$ (f) $(6 - x)(x - 4)$ (g) $(2 - r)(8 - r)$ (h) $(x + 2)(8 - x)$

Question 3: Expand and simplify

- (a) $(y + 2)(y - 2)$ (b) $(w + 7)(w - 7)$ (c) $(a + 1)(a - 1)$ (d) $(x - 10)(x + 10)$
(e) $(g - 8)(g + 8)$ (f) $(6 - x)(6 + x)$ (g) $(4 - r)(4 + r)$ (h) $(11 + y)(11 - y)$

Question 4: Expand and simplify

- (a) $(2c + 1)(2c + 3)$ (b) $(5x + 1)(2x + 5)$ (c) $(3w + 2)(w + 1)$
(d) $(3p + 2)(2p - 1)$ (e) $(5g - 4)(g + 1)$ (f) $(2a - 3)(4a + 7)$
(g) $(4r - 5)(2r - 3)$ (h) $(2y - 3)(9y - 1)$ (i) $(5k - 4)(2k - 1)$
(j) $(2n + 3)(2n + 5)$ (k) $(3b + 4)(2b + 9)$ (l) $(2z - 9)(6z - 5)$
(m) $(4w - 3)(3w - 1)$ (n) $(4r + 3)(3r + 2)$ (o) $(5w - 1)(2w - 3)$

- (p) $(3 + 2c)(5 + c)$ (q) $(9 + 2x)(3 - 2x)$ (r) $(9 - 4y)(2 + 3y)$
 (s) $(3w + 2)(3w - 2)$ (t) $(2y + 3)(2y - 3)$ (u) $(5w - 1)(5w + 1)$
 (v) $(9 - 5a)(9 + 5a)$ (w) $(1 - 2x)(1 + 2x)$ (x) $(3 + 2y)(3 - 2y)$

Question 5: Expand and simplify

- (a) $(a + 2)^2$ (b) $(x + 7)^2$ (c) $(z - 9)^2$ (d) $(p + 1)^2$
 (e) $(c - 5)^2$ (f) $(k + 4)^2$ (g) $(y - 3)^2$ (h) $(10 + r)^2$
 (i) $(3g + 2)^2$ (j) $(2b - 1)^2$ (k) $(3m - 5)^2$ (l) $(2v + 9)^2$
 (m) $(7 - a)^2$ (n) $(4 - 3s)^2$ (o) $(8 + 5h)^2$ (p) $(7 - 2p)^2$

Question 6: Expand and simplify

- (a) $(a + 2)(a + 3) + (a + 4)(a + 1)$ (b) $(2w + 3)(w - 1) + (w - 3)(w - 2)$
 (c) $(x + 9)(3x + 4) - (x + 3)(x - 1)$ (d) $2(x + 1)(x + 4) - (x + 1)(x + 2)$
 (e) $(x + 4)^2 + (x + 1)^2$ (f) $(2x + 1)^2 - (x - 5)^2$

Apply

Question 1: Can you spot any mistakes in the questions below.

Expand and simplify $(5y - 1)(y - 2)$

$$5y^2 - 10y - y - 2$$

$$5y^2 - 11y - 2$$

Expand and simplify $(y - 7)^2$

$$y^2 - 49$$

Answers



Click here



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Timetables

Video 320 on Corbettmaths

Examples



Click here



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Workout

Question 1: Here is part of a train timetable

- (a) What time does the train arrive in Gold City?
- (b) How long is the journey from Westville to Milton?
- (c) How long is the journey from Milton to Red Island?
- (d) How long is the journey from Westville to Market Place?

Westville	08 45
Milton	08 58
Gold City	09 05
Red Island	09 31
Market Place	09 54

Question 2: Here is part of a timetable for a bus

Southville	09 20	10 30	12 10
Leek	09 48	10 58	12 38
Milton	09 55	11 05	12 45
Newtown	10 10	11 20	13 00
Red Island	10 19	11 29	13 09
Sandville	10 45	11 55	13 35
Bakerstown	11 01	12 11	13 51

James catches the bus at 09:20 in Southville.

- (a) What time should the bus arrive in Milton?
- (b) How long does the journey from Southville to Milton take?

Willow arrives at the Red Island bus stop at 11:10
She waits for the next bus to Bakerstown.

- (c) How many minutes should she wait?
- (d) At what time should Willow arrive at Bakerstown?
- (e) How long does the journey last?

Olivia lives in Leek and has a meeting in Newtown at 13:20

- (f) What time should Olivia catch the bus in Leek?

Timetables

Video 320 on Corbettmaths

Question 3: Here is Jenson's timetable on a Wednesday.

maths	break	science	English	lunch	PE
9:00	9:50	10:00	11:05	12:10	1:05
am				pm	2:20

- (a) How long does the maths lesson last?
 (b) How long does the English lesson last?
 (c) How long does the PE lesson last?

Jenson leaves school early to go to a doctor's appointment.
 He leaves the English lesson 35 minutes before the end.

- (d) What time did Jenson leave the English lesson?

Question 4: Here is part of a bus timetable.

Ballymena	15 12	16 12	17 12
Antrim	15 34	-----	17 34
Templepatrick	15 50	-----	17 50
Belfast	16 10	17 00	18 10

A bus leaves Ballymena at 17:12.

- (a) At what time should the bus arrive at Templepatrick?
 (b) How long will the journey take.

Evelyn wants to travel from Ballymena to Belfast.
 The 16:12 is an "express bus."

- (c) How many minutes shorter is the journey if she takes the "express bus?"

Apply

Question 1: Here is part of a train timetable.

Danny lives in Cardiff and works Keynsham.
 He works Monday to Friday.
 Danny travels to work and back each day by train.

How long should Danny spend on the train each week?

Cardiff	06 56
Newport	07 12
Bristol	07 37
Keynsham	07 44
Bath	07 54

Timetables

Video 320 on Corbettmaths

Question 2: Here is part of a bus timetable.

	Departure times			
Newry	14:15	14:45	15:20	15:40
Banbridge	14:37	15:07	15:42	16:02
Dromore	14:48	15:18	15:53	16:13
Belfast	15:18	15:48	16:23	16:43

Niall lives in Newry and his friend lives in Dromore.

Niall lives a 10 minute walk from Newry bus station.

His friend lives a 20 minutes walk from Dromore bus stop.

Niall wants to plan a journey to arrive at his friend's house **before** 4pm.

Plan Niall's journey.

Question 3: This timetable shows the times of trains between Liverpool and London.

Liverpool	04 21	05 19	06 39	07 59
London	07 11	08 09	09 29	10 49
London	14 40	15 28	17 00	18 49
Liverpool	17 30	18 18	19 50	21 39

(a) How long does each journey take?

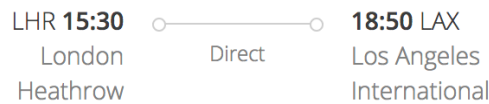
Russell arrives in London at 08:09.

He spends the next 8 hours visiting tourist attractions in London.

Russell catches the next train back to Liverpool.

(b) What time should Russell arrive back in Liverpool?

Question 4: The timetable for a flight from London to Los Angeles is shown



When it is 7am on Tuesday in London, it is 11pm on Monday in Los Angeles.

How long should the journey last?

Give your answer in hours and minutes.

Answers



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Distance-Time Graphs

Video 171 on www.corbettmaths.com

Examples



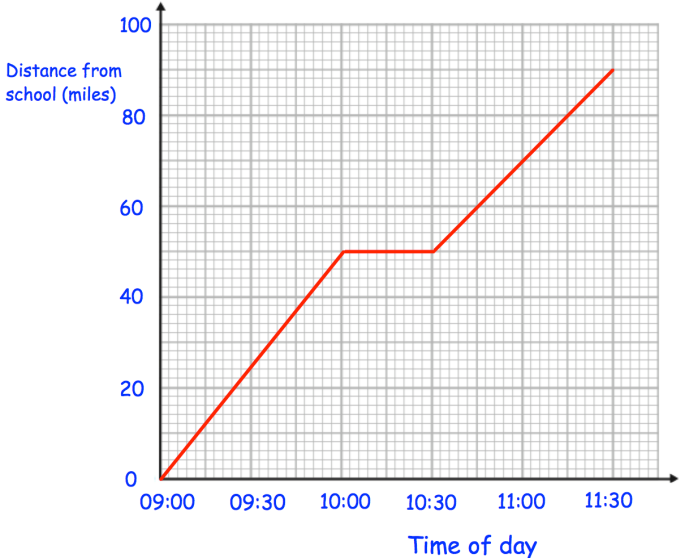
Workout

Click here

Scan here

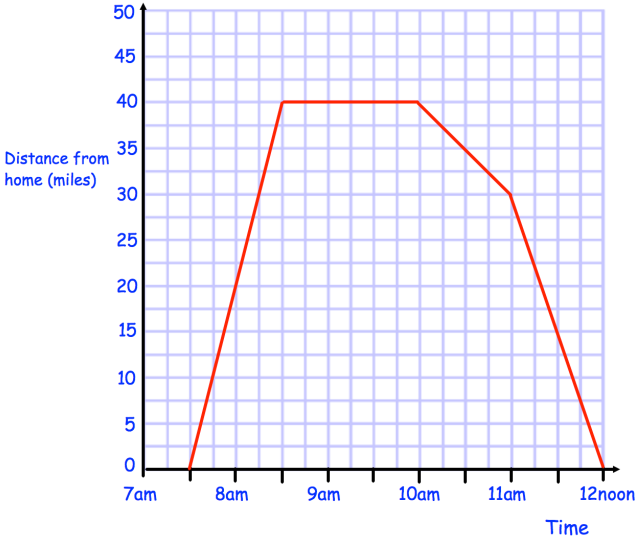
Question 1: The distance-time graph shows class 8A's journey to the zoo.
They stopped for a picnic on the way to the zoo.

- (a) What time did the bus leave school?
- (b) What time did they stop for a picnic?
- (c) How far had they travelled when they stopped for a picnic?
- (d) How long did they stop for?
- (e) What time did they arrive at the zoo?
- (f) How far is the zoo from school?



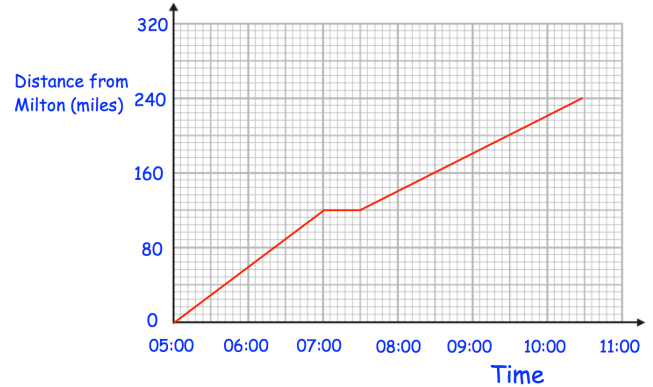
Question 2: Emma travelled to her Grandmother's house and back.
The distance-time graph shows information about her journey.

- (a) What time did Emma begin her journey?
- (b) How far was Emma from home at 8am?
- (c) How long did Emma stay at her Grandmother's house?
- (d) What time did Emma leave her Grandmother's house?
- (e) How far was Emma from home at 11:45?
- (f) How far did Emma travel in total?



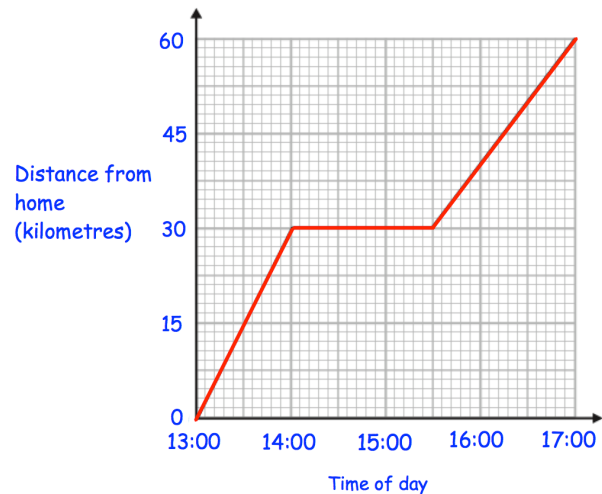
Question 3: A train travels from Milton to Redville, stops for 30 minutes, then travels to Leek.

- (a) How long did it take the train to travel from Milton to Redville?
- (b) How far is Redville from Milton?
- (c) Work out the speed of the train for the journey from Milton to Redville.
- (d) How long did it take the train to travel from Redville to Leek?
- (e) How far is Leek from Redville?
- (f) Work out the speed of the train for the journey from Redville to Leek.



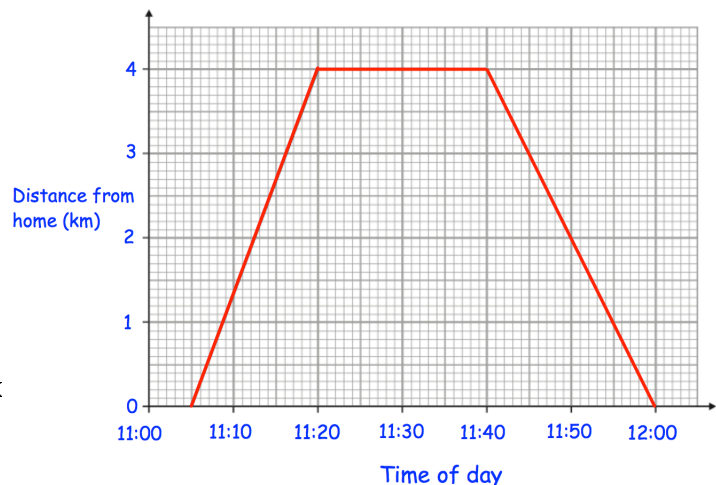
Question 4: Ben drove 60 kilometres, from his home to Liverpool. He stopped and visited his friend Tim on the way.

- (a) Work out Ben's speed for the first part of his journey.
- (b) How long did Ben spend visiting Tim?
- (c) Work out Ben's speed for the last part of his journey.



Question 5: Laura goes for a cycle from her house to the post office, 4km away.

- (a) How long did it take Laura to cycle to the post office?
- (b) Work out Laura's speed cycling to the post office.
- (c) How long did Laura spend at the post office?
- (d) Work out Laura's speed cycling back home.



Distance-Time Graphs

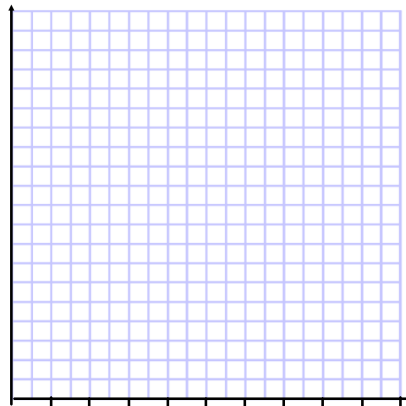
Video 171 on www.corbettmaths.com

Apply

Question 1:

Erin leaves home at 11am.
She cycles at a speed of 16 miles per hour for 90 minutes.
She stops for half an hour.
Erin then cycles home and arrives at 3pm.

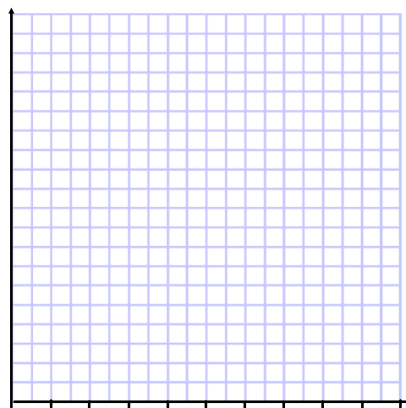
- (a) Draw a distance-time graph to show Erin's journey.
- (b) What is Erin's average speed on the return part of her cycle?



Question 2:

Thomas leaves home at 14:00
He drives at an average speed of 40mph for 3½ hours
Thomas stops for 30 minutes.
He then drives home at an average speed of 70mph.

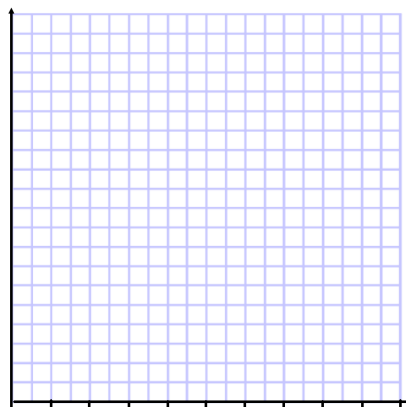
Draw a distance-time graph to show Thomas's journey



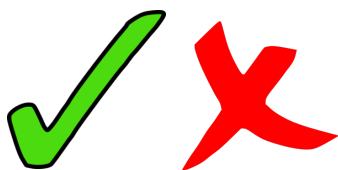
Question 3:

A helicopter leaves Bristol at 10:00.
It flies for 45 minutes at 80km/h.
It lands for 30 minutes and then flies a further 65 kilometres in 30 minutes.
The helicopter then immediately returns to its base in Bristol, flying at 100km/h.

Draw a distance-time graph to show the journey.



Answers



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Examples

Warm up



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Question 1: Convert the times from hours/minutes into hours, without a calculator.

- e.g. 1 45 minutes = 0.75 hours
e.g. 2 1 hour 30 minutes = 1.5 hours

- | | | |
|------------------------|------------------------|------------------------|
| (a) 15 minutes | (b) 30 minutes | (c) 45 minutes |
| (d) 20 minutes | (e) 40 minutes | (f) 2 hours 30 minutes |
| (g) 1 hour 15 minutes | (h) 3 hours 45 minutes | (i) 2 hours 40 minutes |
| (j) 5 hours 30 minutes | (k) 7 hours 20 minutes | (l) 4 hours 15 minutes |

Question 2: Convert the times from hours/minutes into hours.
You may use a calculator if needed.

- | | | |
|------------------------|------------------------|------------------------|
| (a) 18 minutes | (b) 54 minutes | (c) 1 hour 3 minutes |
| (d) 1 hour 36 minutes | (e) 2 hours 48 minutes | (f) 2 hours 33 minutes |
| (g) 8 hours 51 minutes | (h) 3 hours 21 minutes | (i) 27 minutes |

Question 3: Convert the times from hours/minutes into hours.
Give each answer to 3 decimal places.

- | | | |
|------------------------|------------------------|------------------------|
| (a) 44 minutes | (b) 8 minutes | (c) 1 hour 50 minutes |
| (d) 2 hours 10 minutes | (e) 4 hours 26 minutes | (f) 3 hours 29 minutes |
| (g) 5 hours 2 minutes | (h) 2 hours 55 minutes | (i) 59 minutes |

Question 4: Convert the times from hours into hours/minutes, without a calculator.

- | | | |
|---------------------|---------------------|----------------------|
| (a) 0.75 hours | (b) 1.25 hours | (c) 5.5 hours |
| (d) 1.3333... hours | (e) 2.6666... hours | (f) 10.75 hours |
| (g) 3.25 hours | (h) 0.5 hours | (i) 22.3333... hours |

Question 5: Convert the times from hours into hours/minutes.
You may use a calculator if needed.

- | | | |
|----------------|----------------|----------------|
| (a) 0.7 hours | (b) 0.1 hours | (c) 0.9 hours |
| (d) 1.3 hours | (e) 3.6 hours | (f) 6.7 hours |
| (g) 0.85 hours | (h) 1.15 hours | (i) 3.45 hours |

Question 6: Convert the times from hours into hours/minutes.

- | | | |
|----------------------|----------------------|----------------------|
| (a) 0.93333... hours | (b) 0.48333... hours | (c) 1.06666... hours |
| (d) 2.73333... hours | (e) 3.68333... hours | (f) 2.18333... hours |
| (g) 8.01666... hours | (h) 4.46666... hours | (i) 1.76666... hours |

Workout

Question 1: Calculate the average speeds for each of the following, without using a calculator.

- (a) A car travels 60 miles in 2 hours
- (b) A lorry travels 120 miles in 3 hours
- (c) A cyclist travels 45 miles in 5 hours
- (d) A jogger travels 30km in 4 hours
- (e) A runner runs 100 metres in 10 seconds
- (f) A car travels 195 miles in 3 hours
- (g) A helicopter travels 425 miles in 5 hours
- (h) A helicopter flies 840 miles in 7 hours
- (i) A dog runs 216 metres in 12 seconds
- (j) An airplane travels 984 miles in 6 hours
- (k) A bird flies 19 miles in 2 hours
- (l) A car travels 600km in 8 hours

Question 2: Calculate the average speeds for each of the following, without using a calculator.

- (a) A car travels 20 miles in 30 minutes
- (b) A lorry travels 32 miles in 30 minutes
- (c) A bird flies 17 kilometres in 30 minutes
- (d) A man jogs 2 kilometres in 15 minutes.
- (e) A helicopter flies 18 miles in 15 minutes
- (f) An F1 car travels 32 miles in 15 minutes.
- (g) A dog runs 3 kilometres in 10 minutes
- (h) A jet travels 23 miles in 6 minutes.
- (i) A car travels 12 miles in 20 minutes
- (j) A car travels 9 miles in 12 minutes
- (k) A motorcycle travels 36 miles in 40 minutes
- (l) A car travels 27 kilometres in 45 minutes.

Question 3: Calculate the average speeds for each of the following.

- (a) A car travels 63 miles in 1 hour 30 minutes
- (b) A man runs 15 miles in 2 hours 30 minutes
- (c) A helicopter flies 238 miles in 3 hours 30 minutes
- (d) A car travels 85.5 miles 2 hours 15 minutes
- (e) An airplane flies 315 kilometres in 1 hour 45 minutes
- (f) A lorry travels 351 miles in 6 hours 45 minutes
- (g) A car drives 154 miles in 2 hours 20 minutes
- (h) A helicopter flies 160 kilometres in 1 hour 40 minutes

Question 4: Calculate the average speeds for each of the following.

- (a) A man jogs 6 miles in 1 hour 12 minutes
- (b) A motorcycle drives 130 miles in 2 hours 36 minutes
- (c) A helicopter flies 152 miles in 1 hour 54 minutes
- (d) A plane travels 1272 kilometres in 5 hours 18 minutes
- (e) A car travels 98 miles in 2 hours 27 minutes
- (f) A rocket travels 750 miles in 3 minutes
- (g) A car travels 6.4 miles in 7 minutes. Give your answer to 2 decimal places.
- (h) A ship sails 105 miles in 4 hours 28 minutes. Give your answer to 2 decimal places.
- (i) A plane travels 400 miles in 1 hour 55 minutes. Give your answer to 2 decimal places.
- (j) A car drives 500 kilometres in 7 hours 13 minutes. Give your answer to 2 decimal places.

Question 5: Calculate how far each of the following travels.

- (a) A car travels at a speed of 50mph for 3 hours.
- (b) A plane flies at a speed of 230 kilometres per hour for 2 hours.
- (c) A lorry drives for 4 hours at a speed of 45 miles per hour.
- (d) A man runs at a speed of 8 metres per second for 15 seconds.
- (e) A helicopter flies for 8 hours at a speed of 80 miles per hour.
- (f) A dog runs at a speed of 15 m/s for 20 seconds.
- (g) A car travels at a speed of 48 mph for 3 hours.
- (h) A truck travels at a speed of 29 mph for 5 hours.

Question 6: Calculate the distance travelled by each of the following.

- (a) A car drives at a speed of 60mph for 30 minutes.
- (b) A taxi travels for 30 minutes at a speed of 28 mph.
- (c) A car travels at a speed of 44mph for 15 minutes.
- (d) A lorry drives at a speed of 51mph for 20 minutes.
- (e) An airplane travels at a speed of 441mph for 20 minutes.
- (f) A car drives at a speed of 48mph for 45 minutes.
- (g) A helicopter flies at a speed of 72miles per hour for 10 minutes
- (h) A bird flies for 40 minutes at a speed of 60 kilometres per hour.

Question 7: Work out the distance travelled by each of the following.

- (a) A car drives at a speed of 40mph for 1 hour 30 minutes
- (b) A bird flies at a speed of 32 kilometres per hour for 1 hour 30 minutes
- (c) A lorry travels for 2 hours 30 minutes at a speed of 52 mph
- (d) A F1 race car drives for 1 hour 15 minutes at a speed of 124 mph
- (e) A helicopter flies at a speed of 104 mph for 1 hour 45 minutes
- (f) A car drives at a speed of 58 mph for 3 hours 15 minutes
- (g) A man runs at 6 mph for 1 hour 24 minutes
- (h) A car drives for 2 hours 54 minutes at a speed of 50 mph
- (i) A plane flies at a speed of 306 kilometres per hour for 3 hours 20 minutes
- (j) A hot air balloon flies at a speed of 18 mph for 1 hour 40 minutes
- (k) A bird flies for 4 hours 36 minutes at a speed of 40 kilometres per hour.
- (l) A helicopter travels at 98mph for 5 hours 6 minutes.
- (m) A car travels at 40 mph for 1 hour 7 minutes. Give your answer to 2 decimal places.
- (n) A lorry drives at 65 mph for 2 hours 19 minutes. Give your answer to 2 decimal places.
- (o) A car drives at 70 mph for 44 minutes. Give your answer to 2 decimal places.
- (p) A car drives at 32 mph for 1 minute. Give your answer to 2 decimal places.

Question 8: Work out the distance travelled by each of the following.

- (a) A runner runs at a speed of 8m/s for 2 minutes
- (b) A jog runs at a speed of 4m/s for 10 minutes.
- (c) A car drives at 60mph for 90 seconds.
- (d) A lorry drives at 30 mph for 150 seconds.

Question 9: Work out how long each of the journeys take.

- (a) A car drives 120 miles at a speed of 40 mph.
- (b) A lorry drives 250 miles at a speed of 50 mph.
- (c) A bird flies 330 kilometres at a speed of 55 kilometres per hour.
- (d) An object travels 48 miles at speed of 16 mph.
- (e) A man runs 240 metres at a speed of 6m/s
- (f) A dog runs 168 metres at a speed of 12m/s
- (g) A lorry travels 240 miles at a speed of 60mph.
- (h) A helicopter travels 345 miles at a speed of 115 mph.
- (i) A plane travels at a speed of 250 mph and covers a distance of 2250 miles.

Question 10: Calculate how long each journey lasts.
Give each answer in hours and minutes.

- (a) A car travels 100 miles at a speed of 40mph.
- (b) A lorry travels 90 miles at a speed of 60 mph.
- (c) A bus drives at a speed of 48mph and covers a distance of 60 miles.
- (d) A helicopter flies 105 kilometres at a speed of 140 km/h
- (e) A bird covers a distance of 95 miles at a speed of 20 miles per hour.
- (f) A car travels at 50 mph and covers a distance of 110 miles.
- (g) A lorry drives a distance of 452.4 kilometres at a speed of 52 km/h.
- (h) A bird flies 80 miles at a speed of 15 miles per hour
- (i) A ship sails 208 miles a speed of 24 miles per hour
- (j) A jet flies at a speed of 480km/h and covers a distance of 2088 kilometres
- (k) A racing car drives 256 miles at a speed of 120 mph
- (l) A helicopter flies 764 kilometres at a speed of 80 km/h

Question 11: Change the following speeds into metres per second.

- | | | | |
|-------------|------------|------------|-------------|
| (a) 360km/h | (b) 18km/h | (c) 36km/h | (d) 72km/h |
| (e) 10 km/h | (f) 40km/h | (g) 2 km/h | (h) 4.5km/h |

Question 12: Change the following speeds into kilometres per hour.

- | | | | |
|-----------|------------|------------|------------|
| (a) 45m/s | (b) 15m/s | (c) 20m/s | (d) 4m/s |
| (e) 1m/s | (f) 0.5m/s | (g) 0.2m/s | (h) 300m/s |




Question 13: Change these speed into kilometres per hour

- | | | | |
|-----------|-----------|-------------|-------------|
| (a) 10mph | (b) 40mph | (c) 25 mph | (d) 200mph |
| (e) 8mph | (f) 2mph | (g) 10.5mph | (h) 24.6mph |

Question 14: Change these speed into miles per hour

- | | | | |
|------------|--------------|---------------|-----------------|
| (a) 32km/h | (b) 48km/h | (c) 24km/h | (d) 800km/h |
| (e) 16km/h | (f) 0.64km/h | (g) 16000km/h | (h) 2400000km/h |

Apply

1. A bus travels 222 miles in 6 hours.
What was the average speed of the bus?

2. Thomas drives 130 miles at an average speed of 40 mph.
How long does the journey take Thomas?
3. A jumbo jet flies at 484 mph for 4 hours 30 minutes.
How far does the jet travel?

4. Greg and Kevin both travel between two towns that are 90 miles apart.
Greg drives and it takes him 1 hour 30 minutes.
Kevin cycles and it takes him 7 hours 30 minutes.
Work out the difference between their average speeds?
5. Harry catches the train from Belfast to Dublin at 4pm.
The average speed of the train is 70mph and the distance from Belfast to Dublin is 105 miles.
What time does Harry arrive in Dublin?
6. The distance from Sunderland to Wigan is 150 miles.
Mollie leaves Sunderland in her car at 07:50.
Her average speed on the journey is 60mph.
What time does she arrive in Wigan?
7. Jenny drives from Paris to Rochefort, a distance of 483 km
Her average speed on the journey is 84 km/h.
She leaves at 9:50pm.
What time does she arrive in Rochefort?
8. Philip runs at an average speed of 4 m/s.
How long will it take Philip to complete a 10 kilometre race?
Give your answer in minutes and seconds.

9. A car travels for 4 hours at an average speed of 45 mph and then 6 hours at an average speed of 35 mph.
 - (a) Work out the total distance travelled.
 - (b) Work out the average speed for the entire journey.
10. David cycles at 20mph for $1\frac{1}{4}$ hours, then at 16mph for 2 hours and then 12mph for 45 minutes.
 - (a) Work out the total distance travelled.
 - (b) Work out the average speed for the entire journey.

Speed, Distance, Time

Videos 299 on Corbettmaths

11. Mr Jenkins catches the 11:45am bus from London to Glasgow.
The distance between the two cities is 407 miles.
The bus travels at an average speed of 55mph.
What time should he arrive in Glasgow?
12. Michael drives 143 miles from town A to town B in 2 hours 36 minutes.
He then drives from town B to town C at the same speed and it takes 21 minutes.
- (a) Work out Michael's average speed from town A to town B.
(b) How far did Michael travel, in total, from town A to town C?
13. The distance from Junction 19 to Junction 20 on a motorway is 14 miles.
Bethany drove the distance in 15 minutes.
Max drove the distance at a speed of 52mph.
Who was faster?
14. The distance from Swindon to a village is 40 miles.
Vicky drives from the village to Swindon at 60 mph.
Charlie drives from the village to Swindon at 50mph.
Work out how much longer the journey takes Charlie.
Give your answer in minutes.
15. Miss Black completes a journey in 3 stages.
In stage 1, she drives at a speed of 40km/h for 45 minutes.
In stage 2, she drives at 60 km/h for 2 hours 9 minutes.
Altogether, over the 3 stages, Miss Black drives 171.6km in 3 hours 15 minutes
What is her average speed, in km/h, in stage 3?
16. The speed limit on a road is 40mph.
A scooter drives 9 miles in 13 minutes.
Is the scooter breaking the speed limit?



Answers



Click here

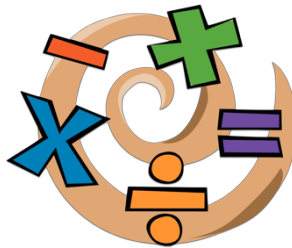


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St Andrew's Academy

Mathematics Department

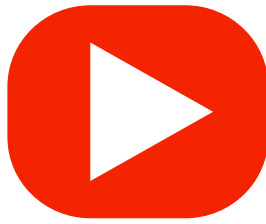


BLOCK SEVEN

Number	Algebra	Mensuration 2
<ul style="list-style-type: none">Integer arithmetic revision.	<ul style="list-style-type: none">Solving Equations with brackets and fractions.Solving Equations with fractions.Solving equations by adding fractions.Solving equations with unknown on denominator.	<ul style="list-style-type: none">Area of composite shapes, trapeziums and parallelograms.Calculate volumes of cubes and cuboids.Circumference of circles.Area of Circles.Surface area.

Examples

Workout



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Question 1: Solve the following equations

(a) $4x + 1 = 2x + 7$

(b) $5x + 4 = 3x + 16$

(c) $2x + 8 = x + 12$

(d) $7x + 1 = 2x + 46$

(e) $6x - 3 = 2x + 13$

(f) $9x - 10 = 7x + 24$

(g) $2x + 21 = 4x + 5$

(h) $x + 2 = 5x - 2$

(i) $6x - 9 = 4x - 1$

(j) $5x + 2 = 16 - 2x$

(k) $3x - 1 = 23 - x$

(l) $6x + 8 = 38 - 4x$

(m) $80 - x = 8x - 1$

(n) $2x + 7 = 17 - 8x$

(o) $15 - x = 27 - 3x$

(p) $12x - 20 = 15x - 38$

(q) $35x + 10 = 20x + 175$

(r) $14x = 2x + 60$

Question 2: Solve the following equations

(a) $3x + 3 = x + 8$

(b) $9x + 10 = 7x + 39$

(c) $3x + 1 = 7x - 17$

(d) $x + 4 = 13 - x$

(e) $16x + 3 = 6x + 24$

(f) $9x + 12 = 6x + 14$

(g) $7x + 24 = 12x - 12$

(h) $2x + 9 = 48 - 6x$

(i) $34 - 12x = 28x - 36$

Question 3: Solve the following equations

(a) $4x + 15 = x + 3$

(b) $8x + 40 = 3x + 5$

(c) $9x + 7 = 11x + 20$

(d) $7x + 9 = 2x - 16$

(e) $9x - 70 = 2x - 91$

(f) $4 - 5x = 3x + 28$

(g) $10x + 136 = -8 - 2x$

(h) $-6x + 2 = -4x + 10$

(i) $-11x - 4 = -3x + 60$

Equations: Letters on Both Sides

Video 113 on www.corbettmaths.com

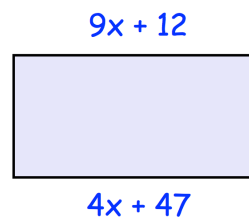
Question 4: Solve the following equations

- (a) $5(x + 3) = 3(x + 9)$ (b) $8(x - 1) = 4(x + 3)$ (c) $3(x + 13) = 10(x - 1)$
- (d) $2(4x - 3) = 5(2x - 5)$ (e) $9(2x - 5) = 3(4x + 7)$ (f) $2(9 - x) = 3(x + 16)$
- (g) $5(2x + 9) + 2(x + 11) = 3(3x + 4) + 46$
- (h) $8(x - 2) - 3(1 - x) = 9(x + 2) + 1$

Apply

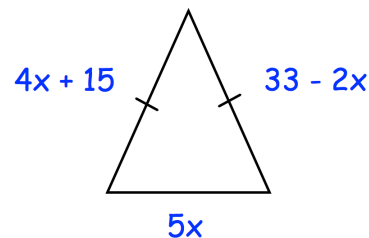
Question 1: Shown is a rectangle

- (a) Explain why $9x + 12 = 4x + 47$
- (b) Find x



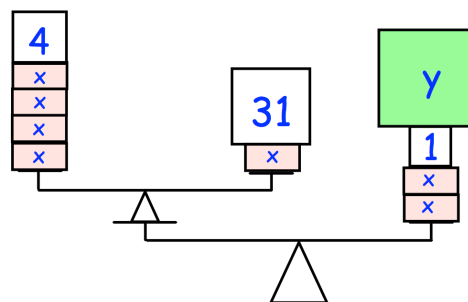
Question 2: Shown is an isosceles triangle

- (a) Explain why $4x + 15 = 33 - 2x$
- (b) Find x
- (c) Find the perimeter of the isosceles triangle



Question 3: Explain why $8x + 3 = 2(4x + 1)$ has no solution.

- Question 4: (a) Find the value of x
- (b) Find the value of y

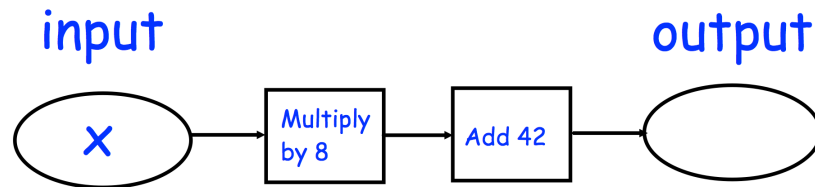


* The mass of the balances are very small, so may be ignored

Equations: Letters on Both Sides

Video 113 on www.corbettmaths.com

Question 5: Shown below is a function machine.
The input and output have the same value.



- (a) Write an equation in terms of x .
(b) Solve the equation to find the value of x .

Question 6: Toby has completed his homework.
Can you spot any mistakes?

(a)

Solve $7x - 5 = 5x + 23$

$$\begin{array}{r} -5x \quad -5x \\ 7x - 5 = 5x + 23 \end{array}$$

$$2x - 5 = 23$$

$$\begin{array}{r} -5 \quad -5 \\ 2x - 5 = 23 \end{array}$$

$$2x = 18$$

$$\begin{array}{r} \div 2 \quad \div 2 \\ 2x = 18 \end{array}$$

$$x = 9$$

(b)

Solve $3x + 11 = 41 - 2x$

$$\begin{array}{r} -2x \quad -2x \\ 3x + 11 = 41 - 2x \end{array}$$

$$x + 11 = 41$$

$$\begin{array}{r} -11 \quad -11 \\ x + 11 = 41 \end{array}$$

$$x = 30$$

Answers



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Examples

Workout



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Question 1: Solve the following equations

(a) $\frac{x}{2} = 6$

(b) $\frac{w}{3} = 1$

(c) $\frac{a}{4} = 10$

(d) $\frac{w}{8} = 7$

(e) $\frac{x}{10} = 23$

(f) $\frac{c}{9} = 5$

(g) $\frac{t}{14} = 15$

(h) $\frac{y}{3} = 1.5$

(i) $\frac{x}{4} = 1.6$

(j) $\frac{x}{2.5} = 8$

(k) $\frac{x}{4} = -3$

(l) $\frac{x}{6} = -12$

Question 2: Solve the following equations

(a) $\frac{x}{4} + 1 = 9$

(b) $\frac{x}{2} - 5 = 9$

(c) $\frac{w}{5} + 2 = 3$

(d) $\frac{x}{8} - 7 = 2$

(e) $\frac{m}{3} - 4 = 0$

(f) $\frac{x}{6} + 7 = 2$

(g) $\frac{k}{4} + 5 = -6$

(h) $\frac{x}{6} - 2 = -8$

Question 3: Solve the following equations

(a) $\frac{x+1}{2} = 3$

(b) $\frac{w-4}{3} = 2$

(c) $\frac{x-2}{7} = 6$

(d) $\frac{w+9}{4} = 8$

(e) $\frac{w-25}{3} = -7$

(f) $\frac{x+2}{4} = -1$

(g) $\frac{w+20}{8} = -2$

(h) $\frac{x-9}{4} = -2$

Question 4: Solve the following equations

(a) $\frac{2a}{3} = 6$

(b) $\frac{2x}{5} = 4$

(c) $\frac{3x}{10} = 6$

(d) $\frac{7x}{2} = 28$

(e) $\frac{3x}{4} = 12$

(f) $\frac{2x}{9} = -8$

(g) $\frac{3x}{2} = 2$

(h) $\frac{5x}{14} = 3$

Question 5: Solve the following equations

(a) $\frac{3x+5}{2} = 7$ (b) $\frac{5x-12}{3} = 11$ (c) $\frac{4x+2}{6} = 5$ (d) $\frac{10x+3}{4} = 4$

(e) $\frac{5x-8}{2} = 10$ (f) $\frac{8x+4}{5} = 12.8$ (g) $\frac{2x+13}{3} = 1$ (h) $\frac{3x-4}{7} = -4$

(i) $\frac{7x-12}{3} = -25$ (j) $\frac{29-2x}{3} = 5$ (k) $\frac{100-5x}{3} = 30$ (l) $\frac{24-3x}{12} = 5$

Question 6: Solve the equations below

(a) $\frac{2x+1}{3} = x-2$ (b) $\frac{5x-3}{2} = 2x+4$ (c) $\frac{x+17}{5} = x+1$

(d) $4x-9 = \frac{2x+3}{3}$ (e) $\frac{9-x}{2} = x+3$ (f) $\frac{15-2x}{3} = 2x-3$

Question 7: Solve the equations below

(a) $\frac{2x-1}{x+3} = 9$ (b) $\frac{x+11}{2x-5} = 2$ (c) $\frac{x+1}{x+4} = 3$

(d) $\frac{5x-24}{x-4} = 3$ (e) $\frac{x+7}{x-3} = -4$ (f) $\frac{3x+8}{9-x} = -2$

Question 8: Solve the equations below

(a) $\frac{x+3}{2} + \frac{x+1}{4} = 10$ (b) $\frac{x+3}{10} + \frac{x-2}{5} = 2$ (c) $\frac{2x-1}{9} + \frac{x+2}{3} = 0$

(d) $\frac{x-1}{4} - \frac{x+3}{2} = -4$ (e) $\frac{4x+9}{15} - \frac{x-3}{5} = 1$ (f) $\frac{x+4}{3} + \frac{x+1}{2} = 1$

(g) $\frac{3x+5}{4} - \frac{x-7}{5} = 1$ (h) $\frac{2x-5}{7} - \frac{2x-1}{2} = 3$ (i) $\frac{x}{2} + \frac{4x+1}{10} = -8$

(j) $\frac{x+1}{2} + \frac{2x-1}{4} + \frac{x+2}{3} = 1$

Answers



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Examples

Workout



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Question 1: Solve each of the following equations.

(a) $\frac{3}{x+2} + \frac{2}{x} = 1$

(b) $\frac{2}{x+4} + \frac{1}{x+2} = 1$

(c) $\frac{4}{x-3} - \frac{3}{x-2} = 1$

(d) $\frac{1}{x-10} + \frac{2}{x-10} = 1$

(e) $\frac{1}{x} + \frac{2}{x+1} = 2$

(f) $\frac{1}{x+3} - \frac{1}{x+1} = 2$

(g) $\frac{3}{x+2} + \frac{2}{x+4} = 2$

(h) $\frac{2}{2x-1} + \frac{1}{x-2} = 1$

(i) $\frac{6}{x+1} - \frac{1}{x+1} = 3$

(j) $1 - \frac{3}{x+3} = \frac{1}{x-1}$

(k) $\frac{x}{x-3} + \frac{4}{x+2} = 2$

(l) $1 + \frac{4}{3x-1} = \frac{3}{2x-1}$

Question 2: Solve each of the equations below.
Give each answer to 2 decimal places.

(a) $\frac{1}{x+3} + \frac{1}{x+8} = 1$

(b) $\frac{1}{2x-1} + \frac{2}{x+5} = 1$

(c) $\frac{2}{2x-3} - \frac{3}{x+4} = 2$

(d) $\frac{x+1}{x-3} + \frac{2}{x-4} = 2$

(e) $\frac{x+5}{x-1} + \frac{1-x}{x-2} = 1$

(f) $\frac{8}{x+1} + \frac{2x+5}{x} = 4$

Apply

Question 1: Can you spot any mistakes?

solve $\frac{7}{x} - \frac{2}{x+2} = 3$

$$\frac{7(x+2)}{x(x+2)} - \frac{2x}{x(x+2)} = 3$$

$$\frac{7x+14}{x(x+2)} - \frac{2x}{x(x+2)} = 3$$

$$\frac{5x+14}{x(x+2)} = 3$$

$$\frac{5x+14}{x^2+2x} = 3$$

continued...

$$5x+14 = 3(x^2+2x)$$

$$5x+14 = 3x^2+6x$$

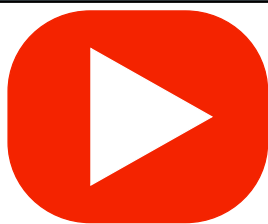
$$0 = 3x^2+x-14$$

$$0 = (3x-7)(x-2)$$

$$x = \frac{3}{7} \text{ or } 2$$

Examples

Workout



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Question 1: Solve each equation below

(a) $\frac{x}{7} = \frac{3}{2}$ (b) $\frac{a}{6} = \frac{3}{10}$ (c) $\frac{c}{20} = \frac{7}{8}$ (d) $\frac{w}{13} = \frac{3}{4}$

(e) $\frac{7}{10} = \frac{c}{8}$ (f) $\frac{4}{5} = \frac{d}{9}$ (g) $\frac{2}{11} = \frac{5}{h}$ (h) $\frac{14}{p} = \frac{3}{20}$

(i) $\frac{2a}{5} = \frac{3}{2}$ (j) $\frac{5x}{11} = \frac{9}{2}$ (k) $\frac{4a}{9} = \frac{6}{5}$ (l) $\frac{7}{4} = \frac{2y}{3}$

(m) $\frac{25}{4y} = \frac{1}{10}$ (n) $\frac{35}{8} = \frac{5w}{12}$ (o) $\frac{10}{17} = \frac{9}{10w}$ (p) $\frac{1}{3y} = \frac{2}{5}$

Question 2: Solve the following equations

(a) $\frac{x+1}{5} = \frac{3}{2}$ (b) $\frac{x+3}{4} = \frac{2}{3}$ (c) $\frac{2x+1}{5} = \frac{7}{2}$

(d) $\frac{3x-1}{5} = \frac{x+11}{2}$ (e) $\frac{x+3}{4} = \frac{2x-1}{7}$ (f) $\frac{3x-4}{3} = \frac{2x-1}{4}$

(g) $\frac{2}{3x-5} = \frac{1}{x+8}$ (h) $\frac{x+2}{2x+3} = \frac{1}{5}$ (i) $\frac{9}{4} = \frac{2x+1}{x-1}$

Question 3: Solve the following equations

(a) $\frac{2}{x+2} = \frac{x+1}{3}$ (b) $\frac{x+1}{3} = \frac{1}{x-1}$ (c) $\frac{4}{x+5} = \frac{x-2}{2}$

(d) $\frac{x-3}{2} = \frac{2}{2x+1}$ (e) $\frac{5}{2x+3} = \frac{3x+1}{2}$ (f) $\frac{2}{7x-1} = \frac{x+3}{12}$

Answers



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Area of an L-Shape

Video 42 on www.corbettmaths.com

Examples

Workout

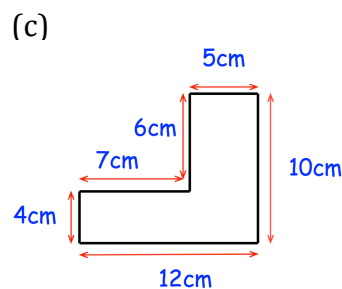
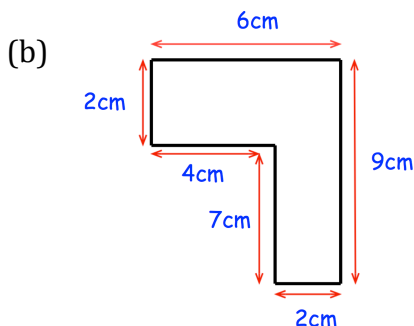
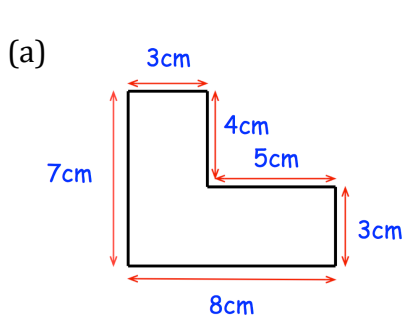


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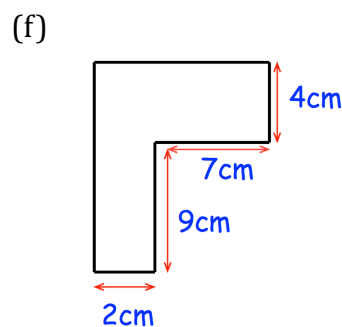
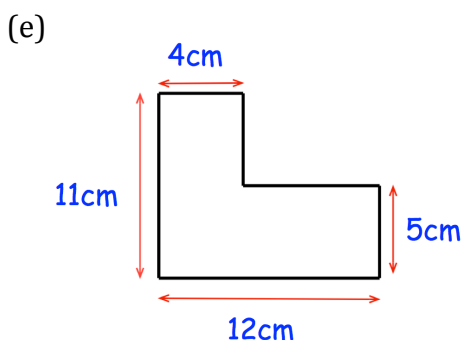
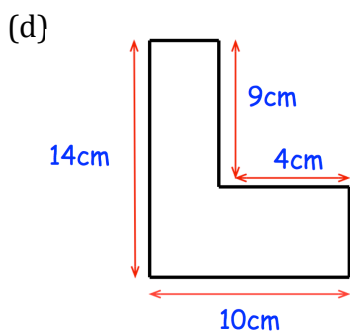
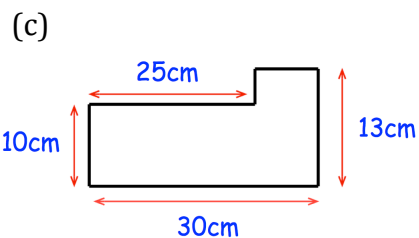
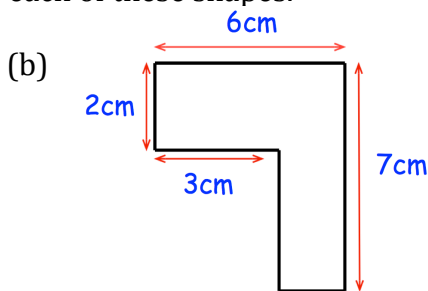
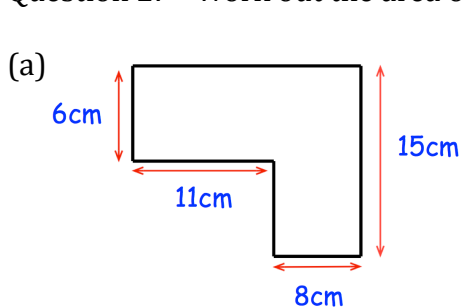


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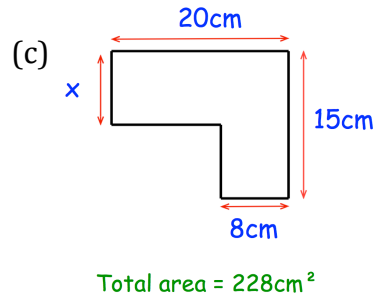
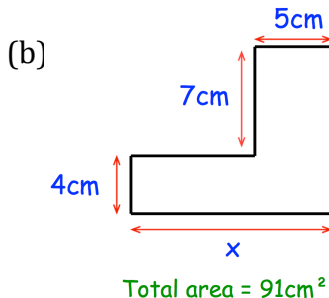
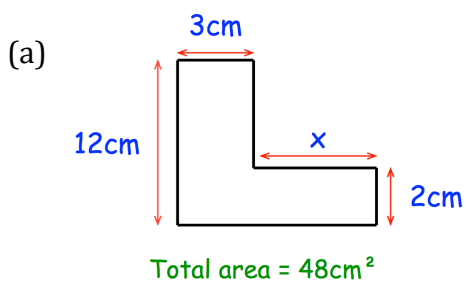
Question 1: Work out the area of each of these shapes.

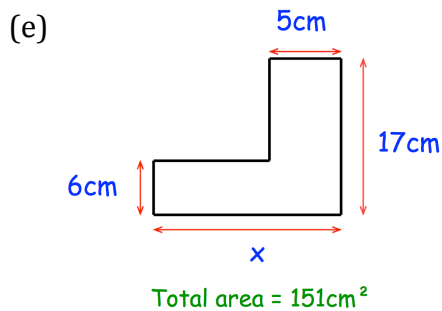
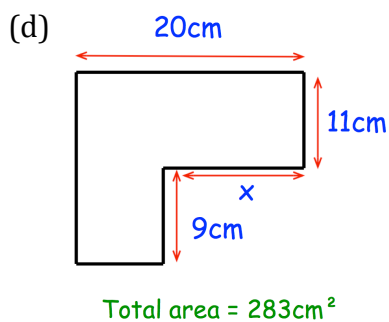


Question 2: Work out the area of each of these shapes.



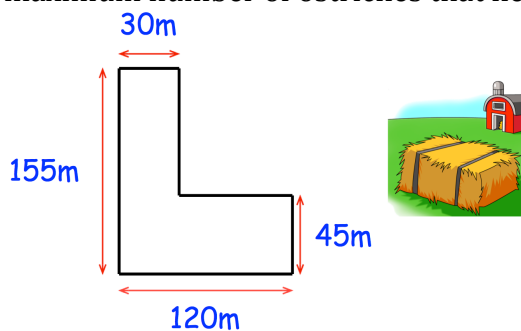
Question 3: The area of each shape is given.
Work out the size of the missing sides.



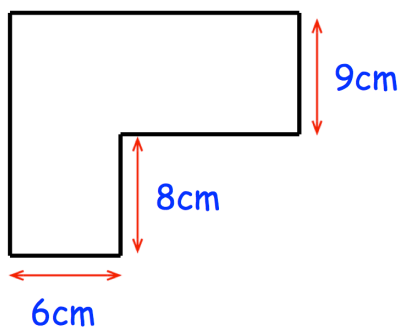


Apply

Question 1: A farmer keeps ostriches in the field shown.
Each ostrich needs at least 12m^2
Calculate the maximum number of ostriches that he can keep.



Question 2: The perimeter of the shape below is 70cm
Calculate the area.



Answers



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Area: Parallelograms
Video 44 on www.corbettmaths.com

Examples



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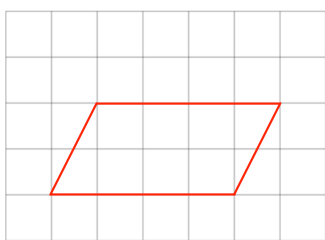


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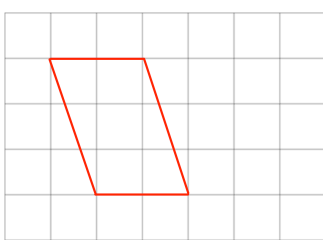
Workout

Question 1: The following parallelograms are drawn on centimetre-squared paper. Find the area of each.

(a)



(b)

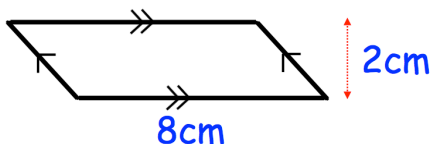


(c)

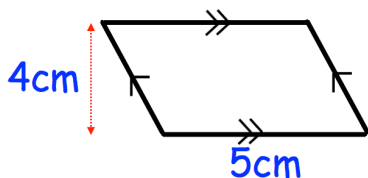


Question 2: Work out the area of each of the parallelograms below. Include suitable units.

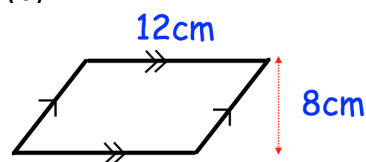
(a)



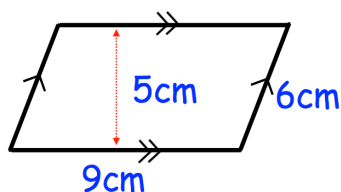
(b)



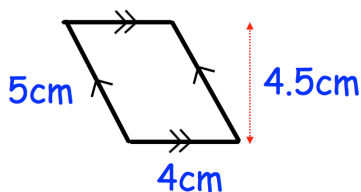
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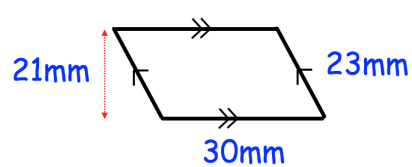
(d)



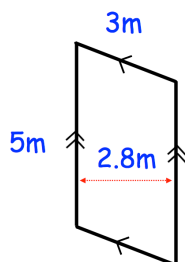
(e)



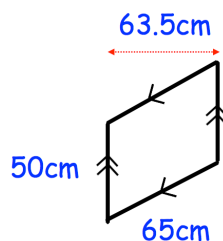
(f)



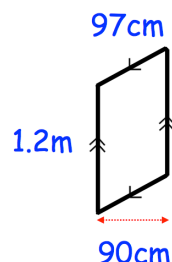
(g)



(h)



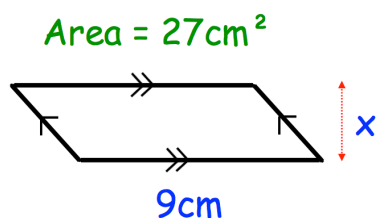
(i)



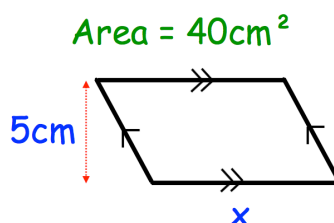
Question 3: A parallelogram has a base of 8cm and a perpendicular height of 6cm. Calculate the area of the parallelogram.

Question 4: The areas of each of the parallelograms has been given.
Calculate the length of the missing sides.

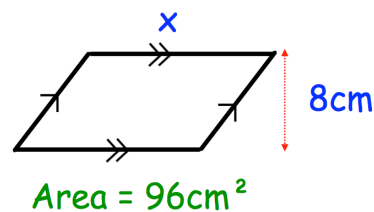
(a)



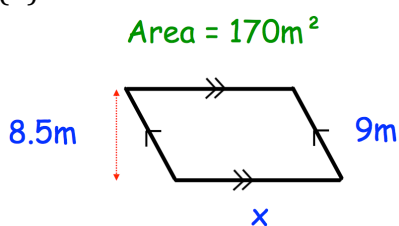
(b)



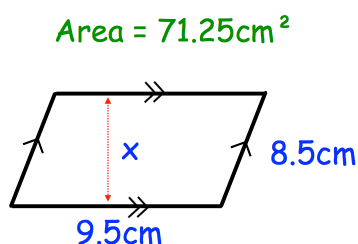
(c)



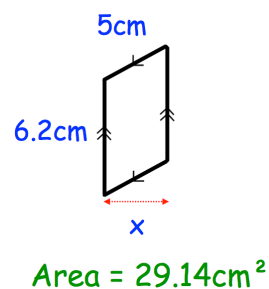
(d)



(e)



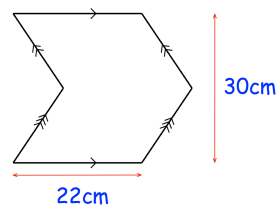
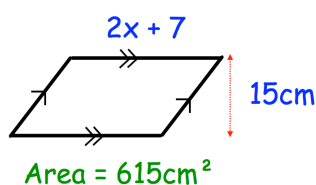
(f)



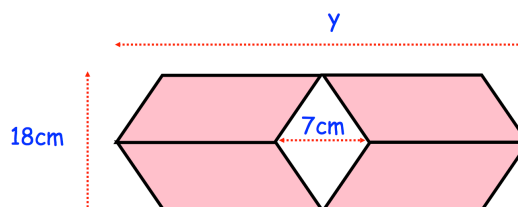
Apply

Question 1: The logo below is created by joining two congruent parallelograms.
Calculate the area of the logo.

Question 2: Find x



Question 3: A shape is made from 4 congruent parallelograms.
The area of the shape is 792cm^2
Find y



Answers



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Examples

Workout



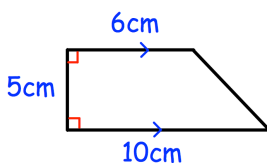
Click here



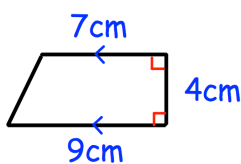
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Question 1: Find the area of each trapezium.

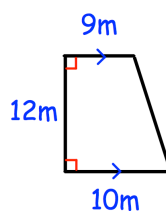
(a)



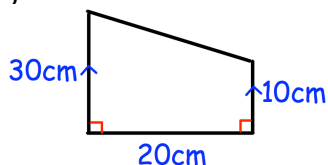
(b)



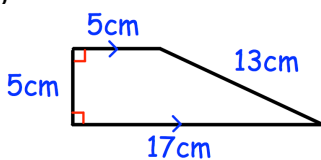
(c)



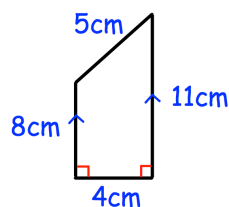
(d)



(e)

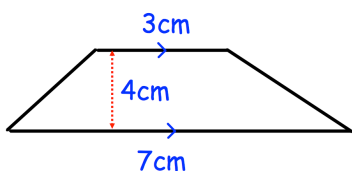


(f)

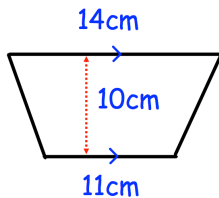


Question 2: Find the area of each trapezium.

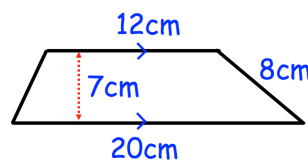
(a)



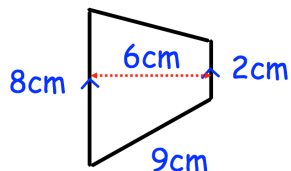
(b)



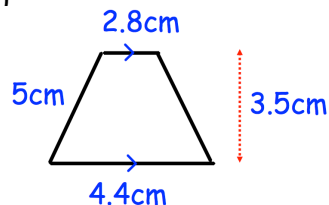
(c)



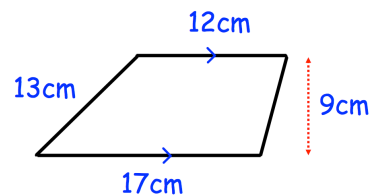
(d)



(e)



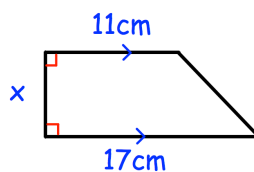
(f)



Question 3: Find x for each trapezium.

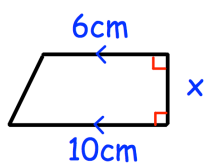
(a)

Area = 70cm^2



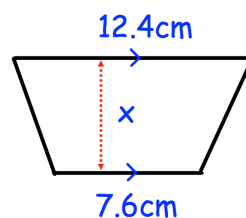
(b)

Area = 68cm^2



(c)

Area = 115cm^2

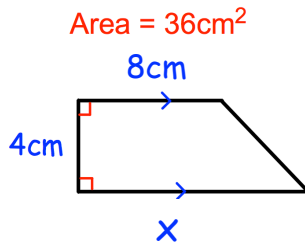


Area of a Trapezium

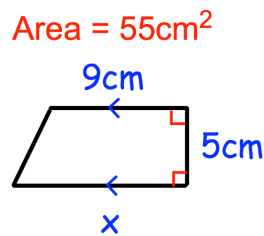
Video 48 on Corbettmaths

Question 4: Find x for each trapezium.

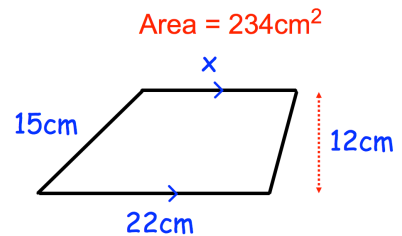
(a)



(b)



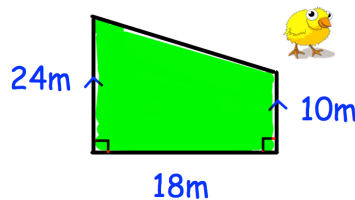
(c)



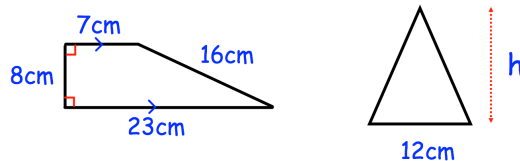
Apply

Question 1: Sketch five different trapezia with an area of 80cm^2

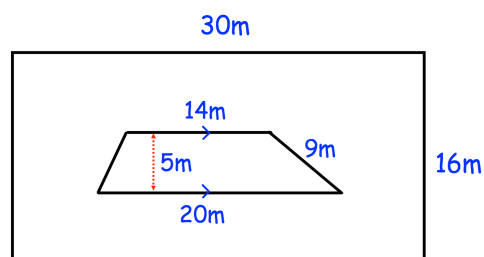
Question 2: Mr Taylor keeps chickens in the field shown.
Each chicken needs 3m^2 .
What is the maximum number of chickens he can keep in the field?



Question 3: The trapezium and the triangle have the same area.
Calculate the height of the triangle.



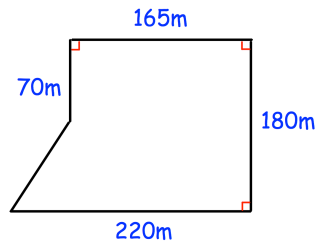
Question 4: Shown is a rectangular garden.
There is a flowerbed in the shape of a trapezium.
What percentage of the garden does the flowerbed cover?



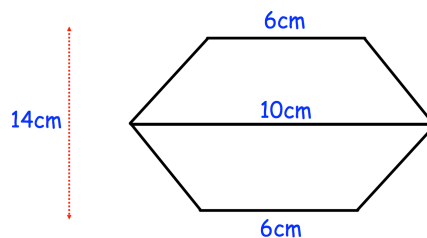
Area of a Trapezium

Video 48 on Corbettmaths

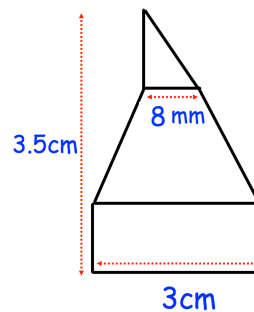
- Question 5: Farmer Richards owns this field.
The crop he plants earns him £7 for each square metre
How much money does he earn in total?



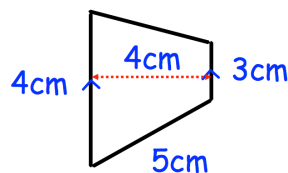
- Question 6: A badge is made by joining two congruent trapezia.
Find the area of the badge.



- Question 7: A shape has been made from joining a rectangle, trapezium and triangle.
The height of the shape is 3.5cm.
The ratio of the height of the rectangle to the height of the trapezium to the height of the triangle is 2:3:2.
Calculate the area of the shape.



- Question 8: The trapezium below is enlarged by scale factor 3.
(a) Work out the area of the enlarged trapezium.
(b) How many times larger is the area of the enlarged triangle than the trapezium below?



Answers



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Area of a Circle

Videos 40, 59 on Corbettmaths

Examples



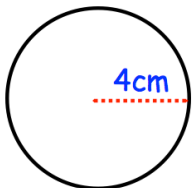
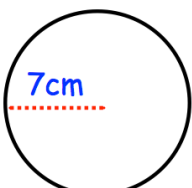
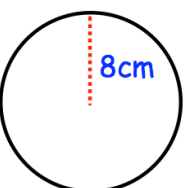
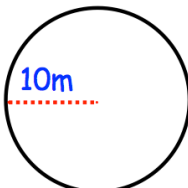
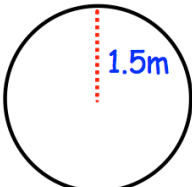
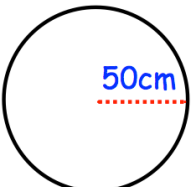
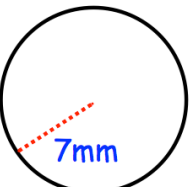
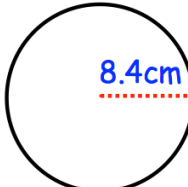
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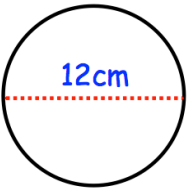
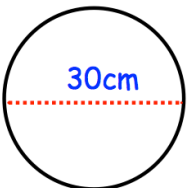
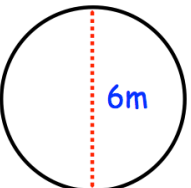
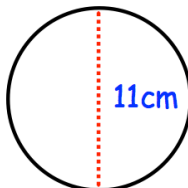
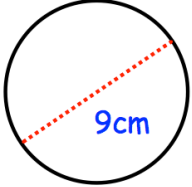
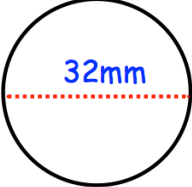
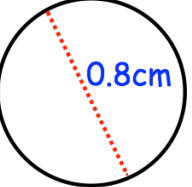
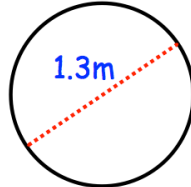
Scan here

Workout

Question 1: Calculate the area of the following circles. Give your answers to 1 decimal place.

(a) 	(b) 	(c) 	(d) 
(e) 	(f) 	(g) 	(h) 

Question 2: Calculate the area of the following circles. Give your answers to 1 decimal place.

(a) 	(b) 	(c) 	(d) 
(e) 	(f) 	(g) 	(h) 

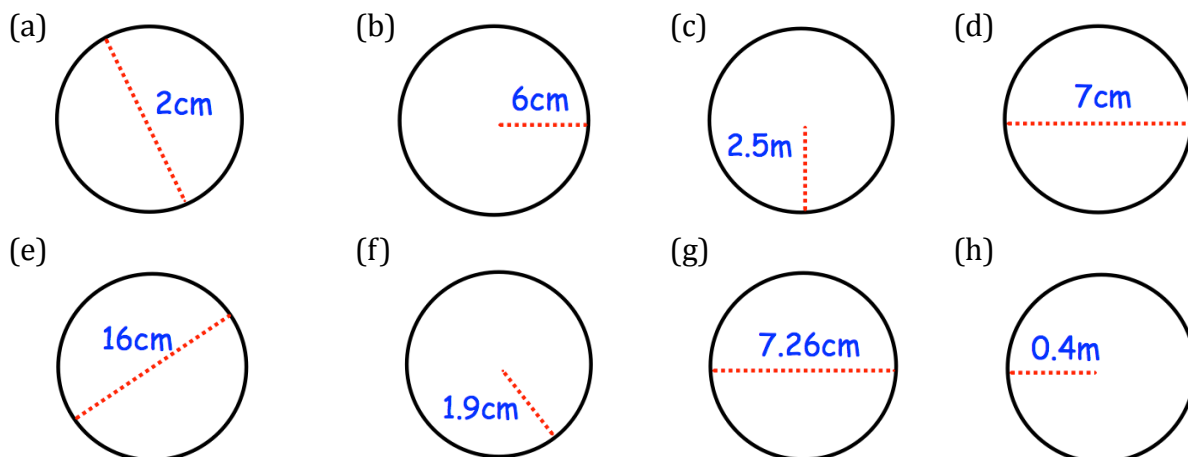
Question 3: Work out the area of the following circles. Give your answers to 1 decimal place.

- | | |
|------------------------------------|--------------------------------|
| (a) A circle with radius 9cm | (b) A circle with radius 12m |
| (c) A circle with diameter 40cm | (d) A circle with diameter 1km |
| (e) A circle with diameter 5 yards | (f) A circle with radius 10.5m |

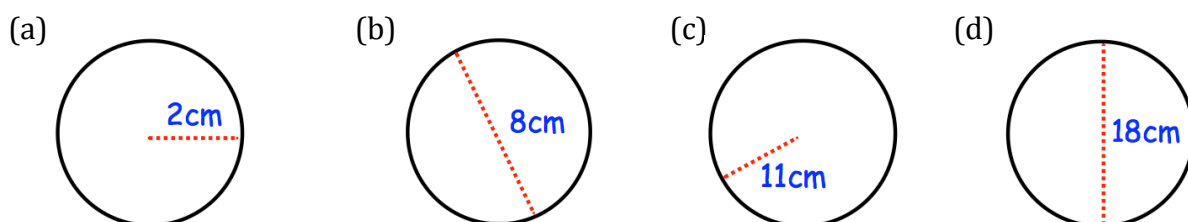
Area of a Circle

Videos 40, 59 on Corbettmaths

Question 4: Calculate the area of the following circles. Give your answers to 1 decimal place.



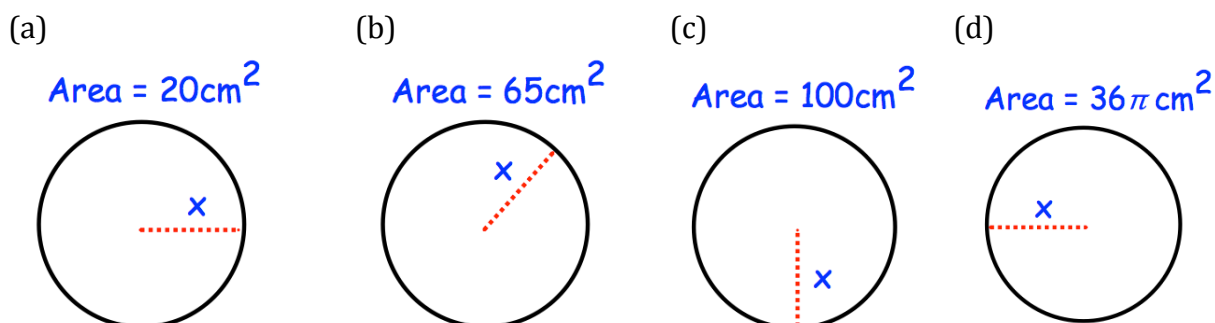
Question 5: Calculate the area of the following circles. Leave your answer in terms of π



Question 6: Work out the area of the following circles. Leave your answer in terms of π

- (a) A circle with radius 7cm
- (b) A circle with radius 1cm
- (c) A circle with diameter 10cm
- (d) A circle with radius 3cm
- (e) A circle with diameter 4cm

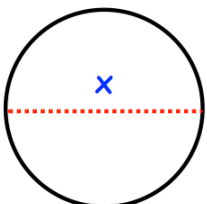
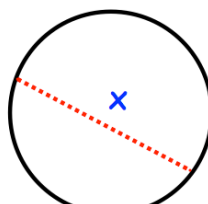
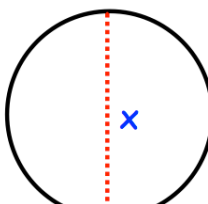
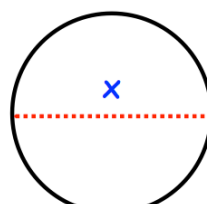
Question 7: Find the size of the radius for each of the following circles. Give your answer to 2 decimal places.



Area of a Circle

Videos 40, 59 on Corbettmaths

Question 8: Find the size of the diameter for each of the following circles.
Give your answer to 2 decimal places.

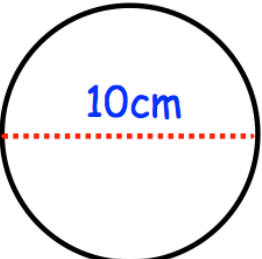

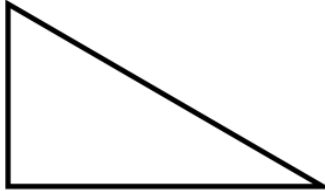
(a) $Area = 400cm^2$	(b) $Area = 50cm^2$	(c) $Area = 10cm^2$	(d) $Area = 16\pi cm^2$
			

Apply

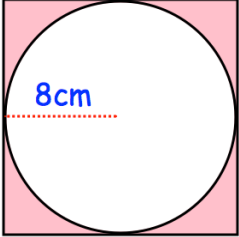
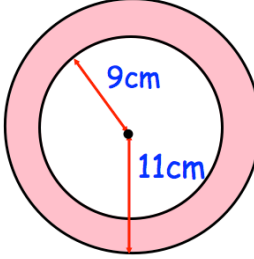
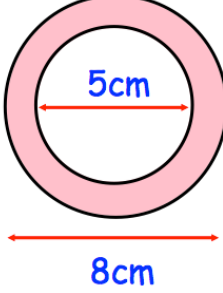
Question 1: A circular table top has a diameter of 90cm. Work out the area of the table top.

Question 2: A circular badge has radius 3cm. Calculate the area of the badge.

Question 3: Shown below is a circle, a rectangle and a right angled triangle.
Which shape has the greatest area?

		
Shape A	Shape B	Shape C

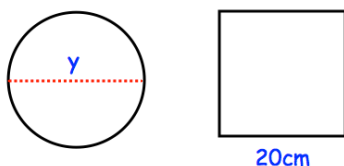
Question 4: Calculate the shaded area for each shape below.

(a) 	(b) 	(c) 
---	---	---

Area of a Circle

Videos 40, 59 on Corbettmaths

Question 5: The circle and square have the same area. Find y , the diameter of the circle.



Question 6: The circumference of a circle is 60cm.
Work out the area of the circle.

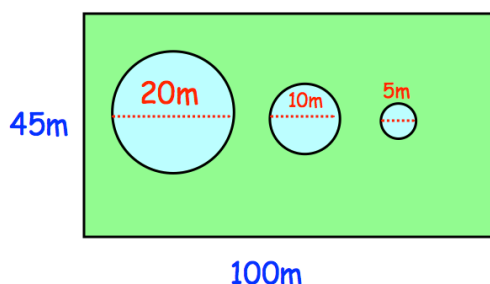
Question 7: The circumference of a circle is 1m.
Work out the area of the circle.

Question 8: The area of a circle is 80cm^2 .
Work out the circumference of the circle.

Question 9: The area of a circle is 2m^2 .
Work out the circumference of the circle.

Question 10: A rectangular lawn is 100m long and 45m wide.
There are 3 circular ponds, with diameters of 20m, 10m and 5m respectively.
Mrs Jones wants to cover the lawn with grass seed.
Each packet of grass seed covers 50m^2 and costs £1.49

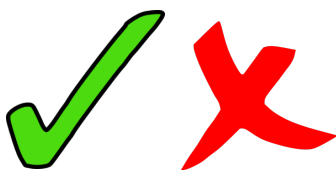
How much will it cost Mrs Jones to cover the lawn with grass seed?



Question 11: A circular plaque of diameter 6cm is cut from a square piece of metal with side length 6cm.

What percentage of the metal is wasted?

Answers



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Area: Semi-circle
Video 47 on www.corbettmaths.com

Examples

Workout

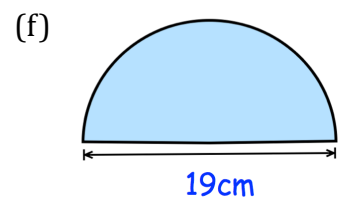
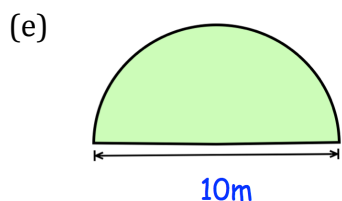
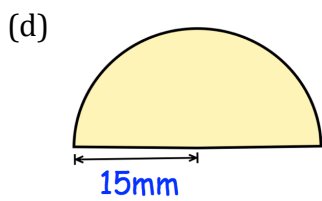
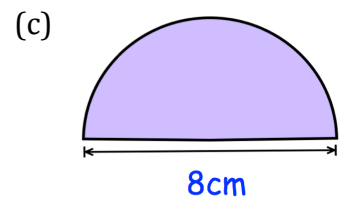
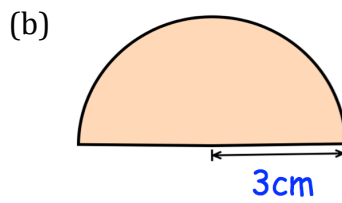
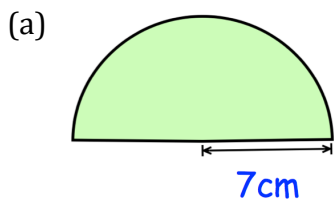


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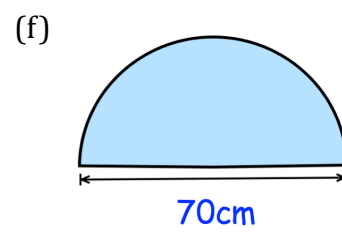
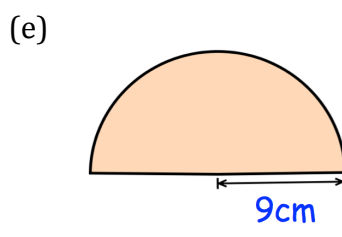
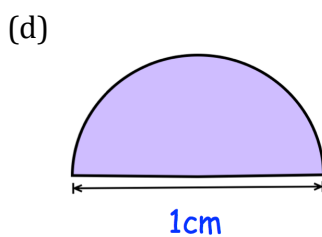
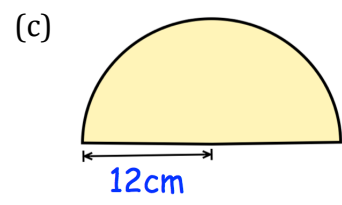
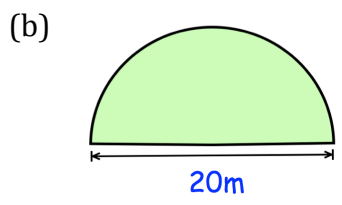
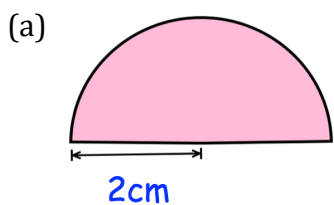


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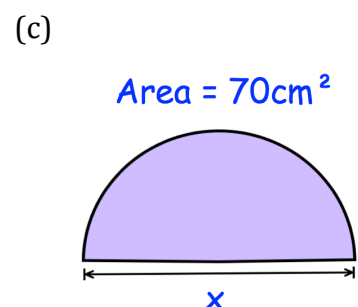
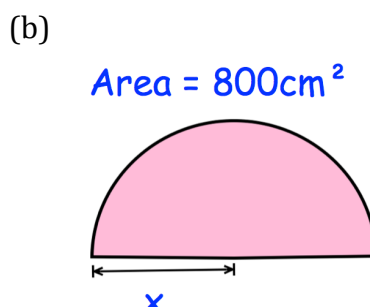
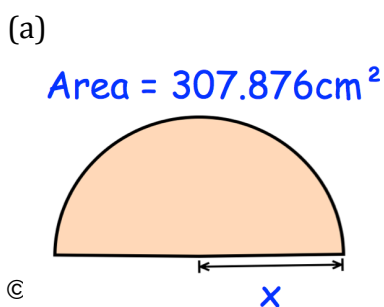
Question 1: Calculate the area of each of these semi-circles.
Give your answers to 1 decimal place and include suitable units.



Question 2: Work out the area of each of these semi-circles.
Give your answers in terms of π and include suitable units.



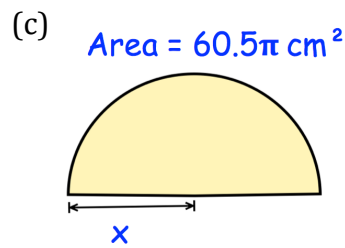
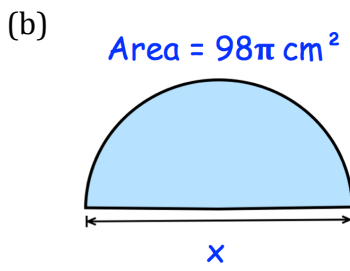
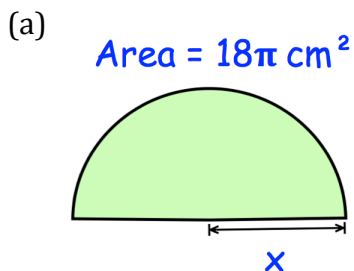
Question 3: Calculate the size of x.



Area: Semi-circle

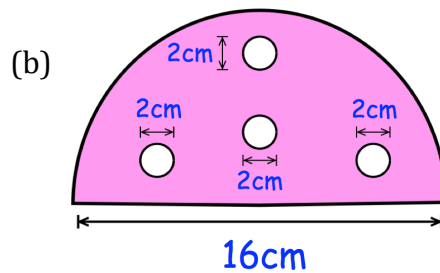
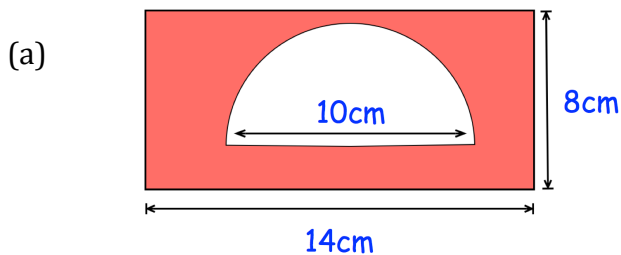
Video 47 on www.corbettmaths.com

Question 4: Work out the size of x.

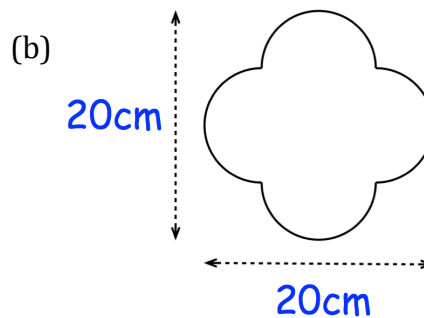
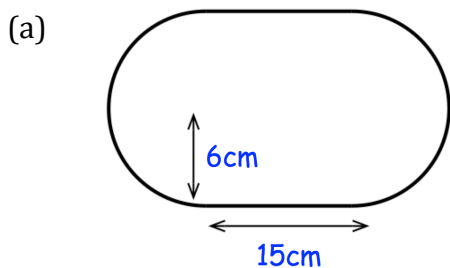


Apply

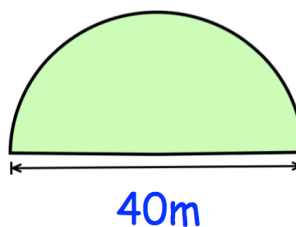
Question 1: Calculate the shaded area



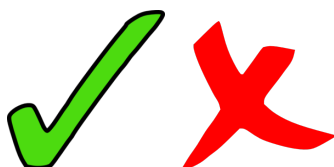
Question 2: Calculate the area



Question 3: Farmer Jenkins is planting a crop in his semi-circular field. The seed costs £0.80 per square metre. When fully grown, Farmer Jenkins can sell the crop from 4m^2 for £45. Calculate the profit he should make.



Answers



Click here



Scan here

Examples

Workout



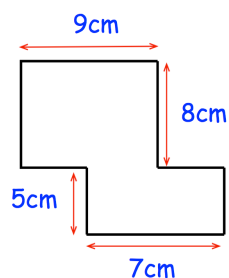
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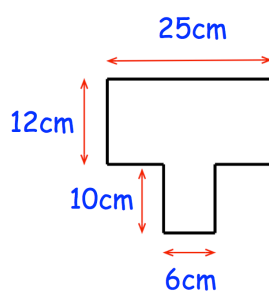
Scan here

Question 1: Work out the area of each of these shapes.

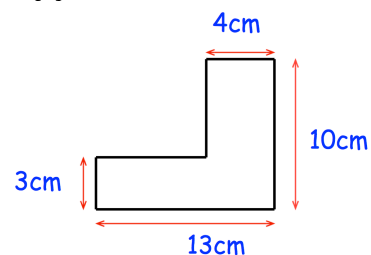
(a)



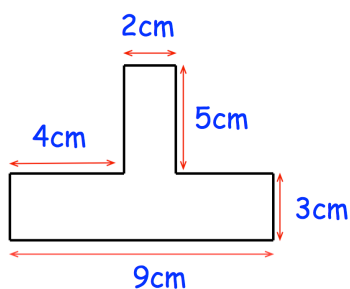
(b)



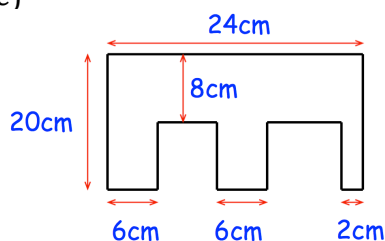
(c)



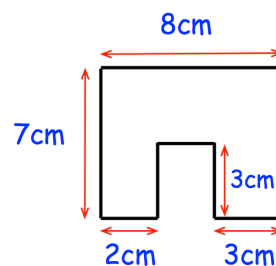
(d)



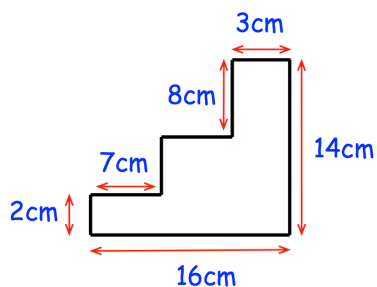
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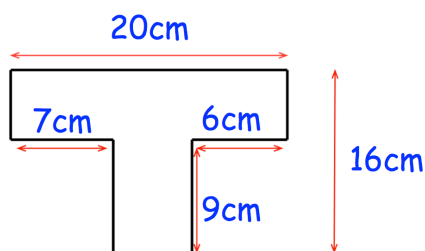
(f)



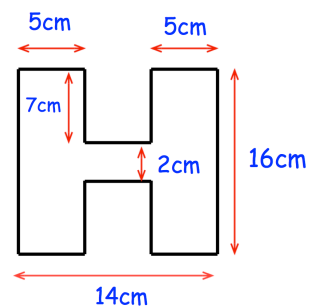
(g)



(h)

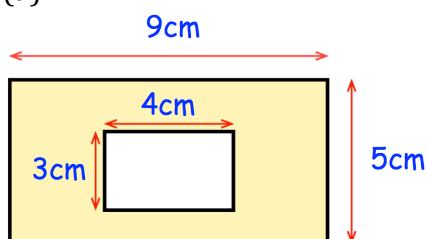


(i)

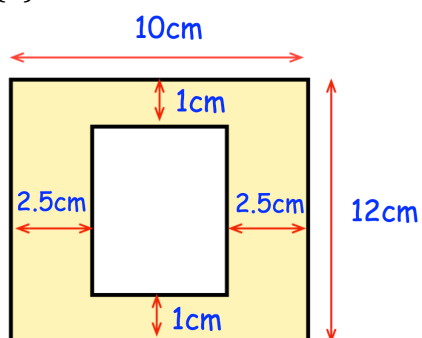


Question 2: Work out the shaded area.

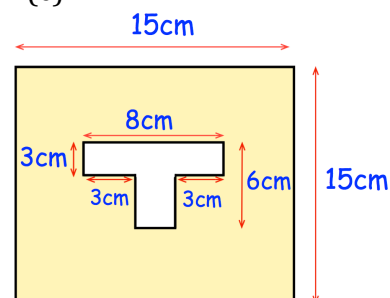
(a)



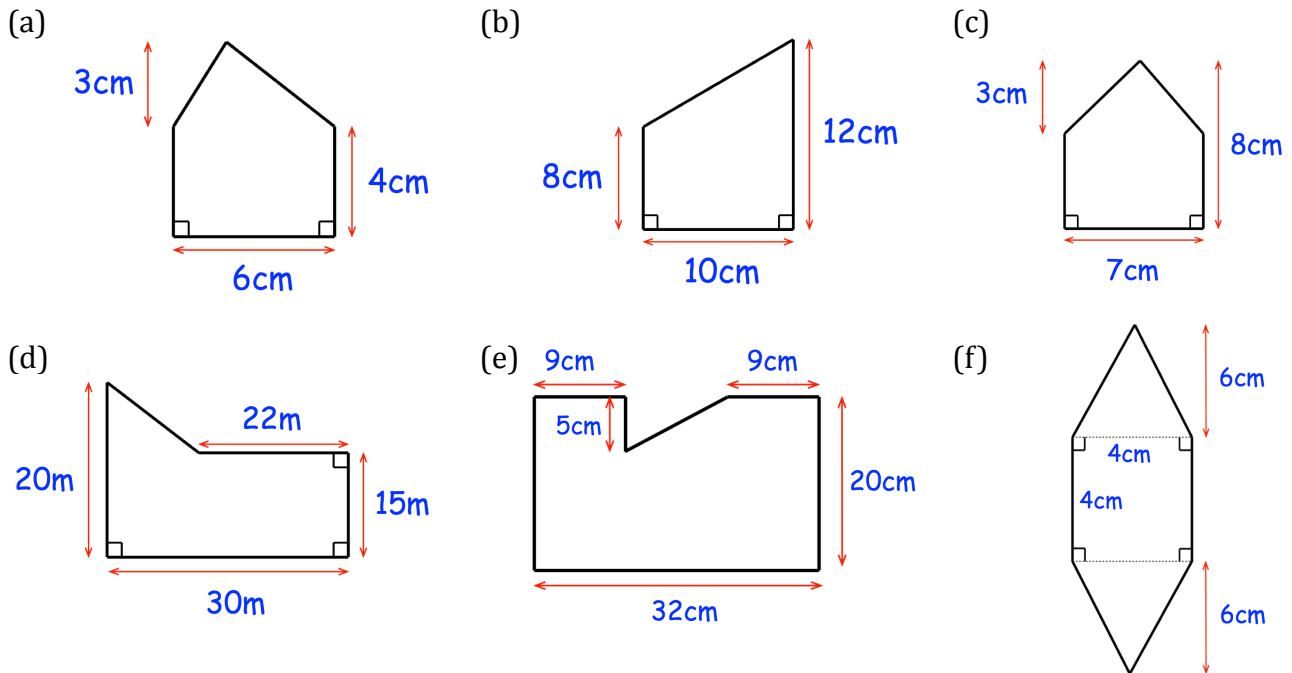
(b)



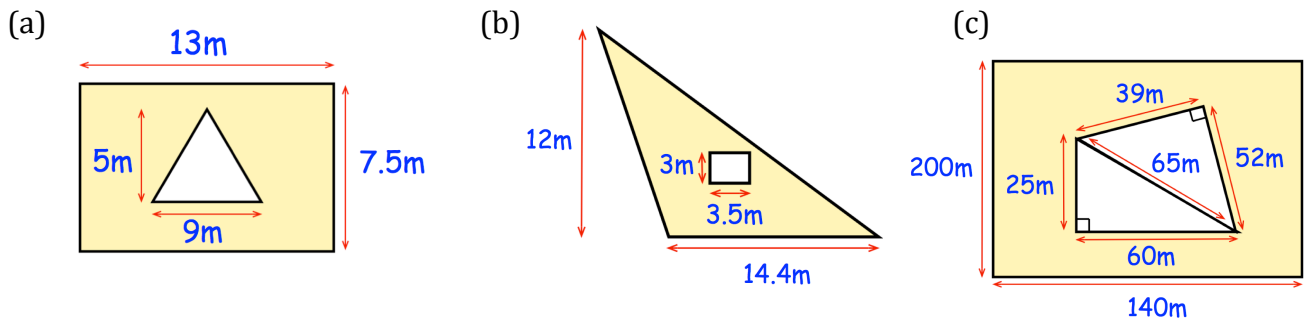
(c)



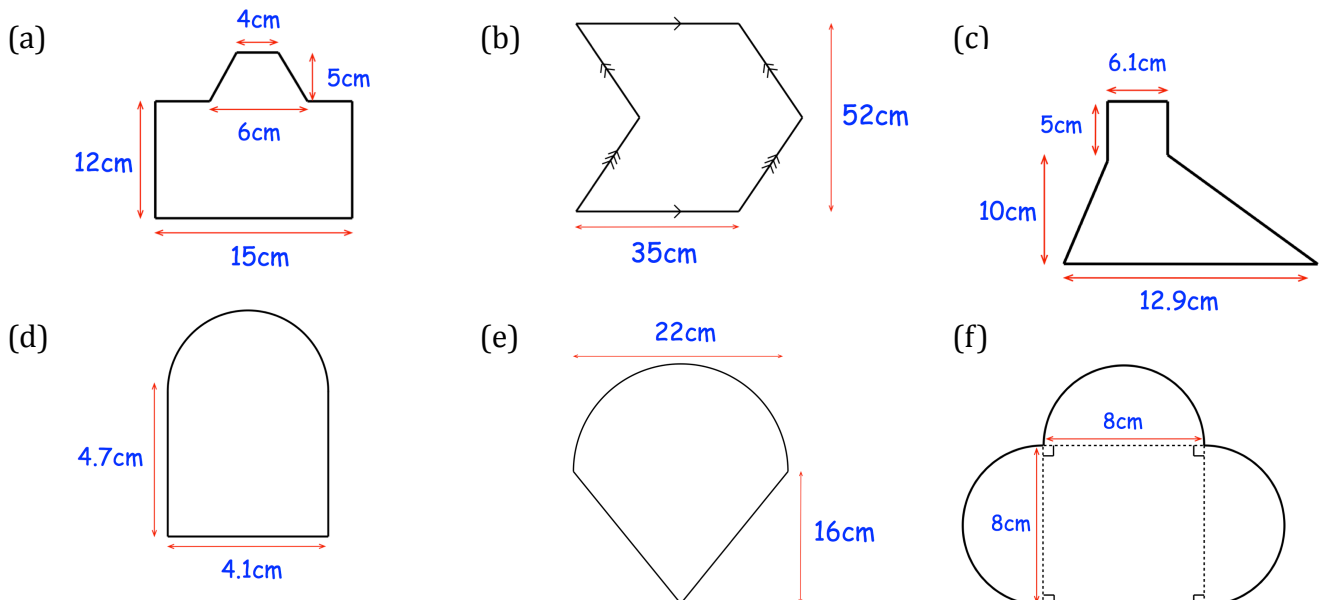
Question 3: Work out the area of each of these shapes.



Question 4: Work out the shaded area.

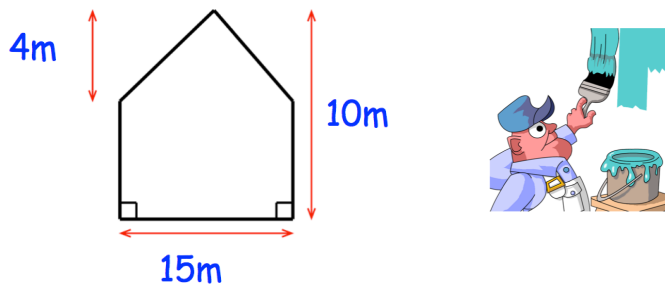


Question 5: Work out the area of each of these shapes.

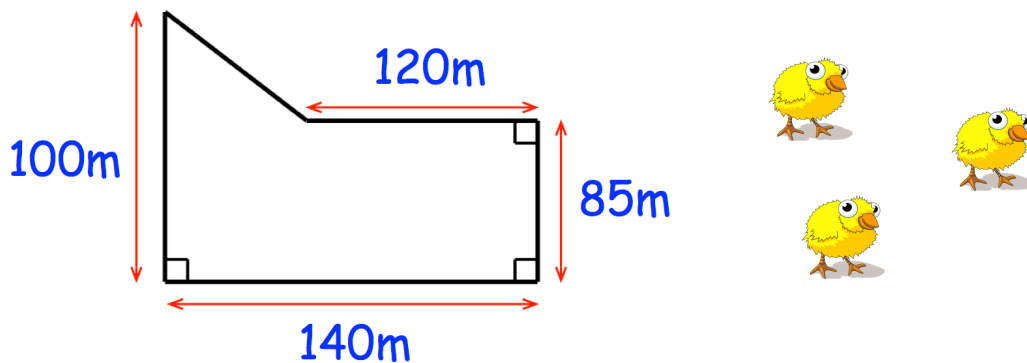


Apply

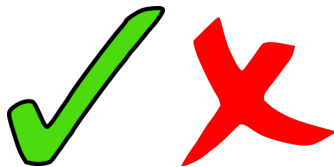
Question 1: William is painting the side of his house.
He has 8 litres of paint and each litre of paint covers 16m^2
Does William have enough paint?



Question 2: Farmer Martin keeps chickens in the field below.
Each chicken needs 3m^2 .
What is the maximum number of chickens that he can keep?



Answers



Click here



Scan here

Circumference

Video 60 on www.corbettmaths.com

Examples



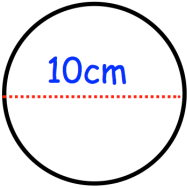
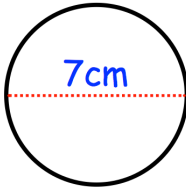
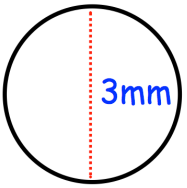
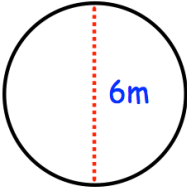
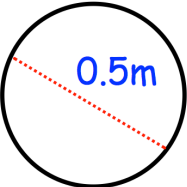
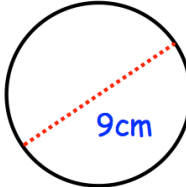
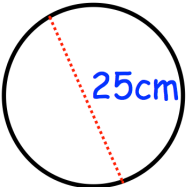
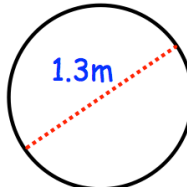
Click here



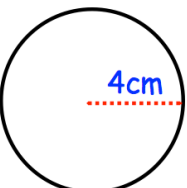
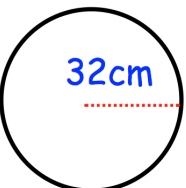
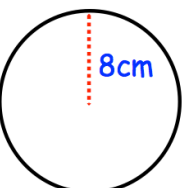
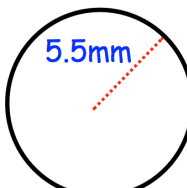
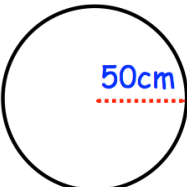
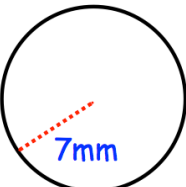
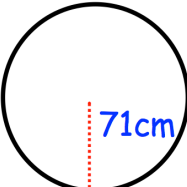
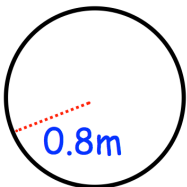
Scan here

Workout

Question 1: Calculate the circumference of the following circles.
Give your answers to 1 decimal place.

(a) 	(b) 	(c) 	(d) 
(e) 	(f) 	(g) 	(h) 

Question 2: Calculate the circumference of the following circles.
Give your answers to 1 decimal place.

(a) 	(b) 	(c) 	(d) 
(e) 	(f) 	(g) 	(h) 

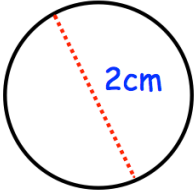
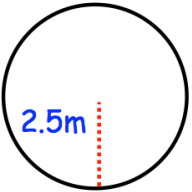
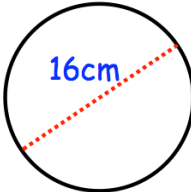
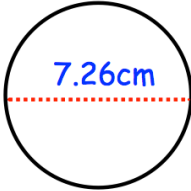
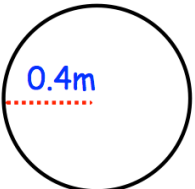
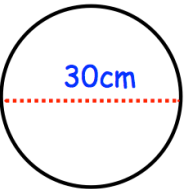
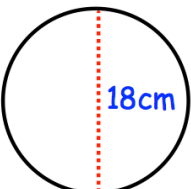
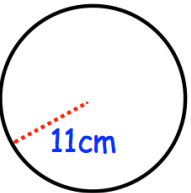
Question 3: Work out the circumference of the following circles.
Give your answers to 1 decimal place.

- | | |
|--------------------------------|--------------------------------------|
| (a) A circle with diameter 2cm | (d) A circle with radius 0.15km |
| (b) A circle with diameter 14m | (e) A circle with diameter 90 inches |
| (c) A circle with radius 3cm | (f) A circle with radius 5.7 yards |

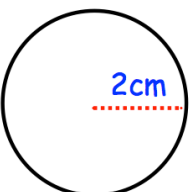
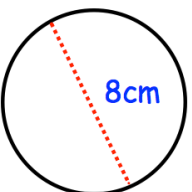
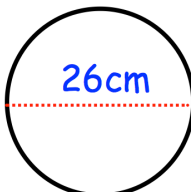
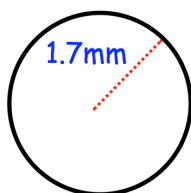
Circumference

Video 60 on www.corbettmaths.com

Question 4: Calculate the circumference of the following circles.
Give your answers to 1 decimal place.

(a) 	(b) 	(c) 	(d) 
(e) 	(f) 	(g) 	(h) 

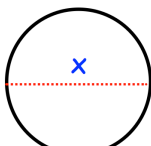
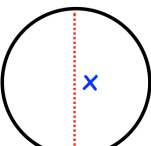
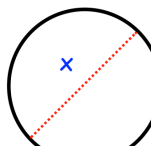
Question 5: Calculate the circumference of the following circles.
Leave your answer in terms of π

(a) 	(b) 	(c) 	(d) 
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Question 6: Work out the circumference of the following circles.
Leave your answer in terms of π

- (a) A circle with diameter 12cm
- (b) A circle with diameter 52cm
- (c) A circle with radius 10cm
- (d) A circle with diameter 3cm
- (e) A circle with radius 4km

Question 7: Find the size of the diameter for each of the following circles.
Give your answer to 2 decimal places.

(a) Circumference = 12cm 	(b) Circumference = 50cm 	(c) Circumference = 3m 
--	--	--

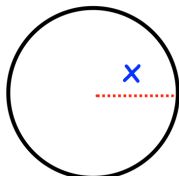
Circumference

Video 60 on www.corbettmaths.com

Question 8: Find the size of the radius for each of the following circles.
Give your answer to 2 decimal places.

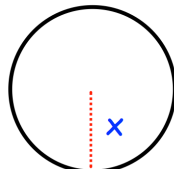
(a)

Circumference = 80cm



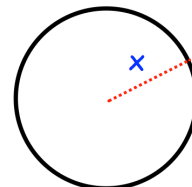
(b)

Circumference = 42m



(c)

Circumference = 2m



Apply

Question 1: A circular table top has a diameter of 85cm. Work out the circumference of the table top.

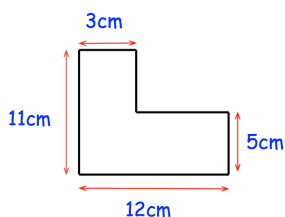
Question 2: A pizza has a circumference of 50cm. Work out the diameter of the pizza.



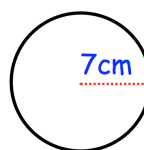
Question 3: A bicycle wheel has a diameter of 62cm. The wheel makes 80 complete revolutions.
How far has the bicycle travelled?
Give your answer in metres.



Question 4: Which shape has the greatest perimeter?



Shape A

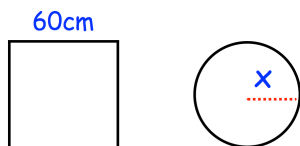


Shape B

Circumference

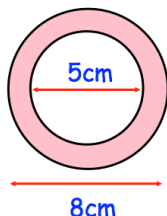
Video 60 on www.corbettmaths.com

Question 5: The circle and the square have the same perimeter.
Calculate the value of x.

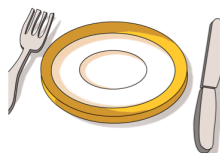


Question 6: A wheel has a diameter of 15cm.
The wheel travels 50 metres.
How many complete revolutions does the wheel complete?

Question 7: Calculate the perimeter of the pink shape.



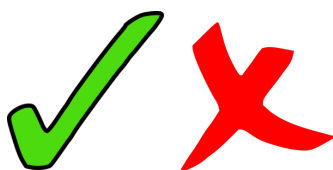
Question 8: Nicole is a wedding organiser.
The guests are to sit at circular tables with a diameter of 180cm.
Each guest needs 70cm around the circumference of the table.
There are 18 tables at the venue.
A total of 145 guests are attending the wedding.
Are there enough tables?



Question 9: The area of a circle is 40cm.
Calculate the circumference of the circle.

Question 10: The circumference of a circle is 1m.
Calculate the area of the circle.

Answers



Click here



Scan here

Perimeter: Semi-Circle

Video 62 on www.corbettmaths.com

Examples

Workout

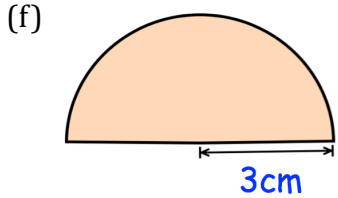
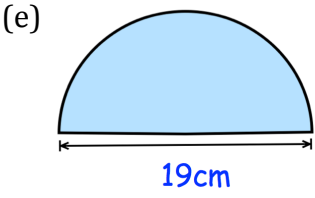
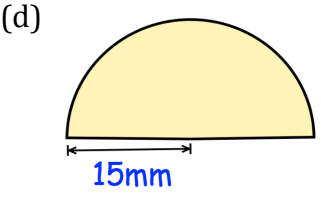
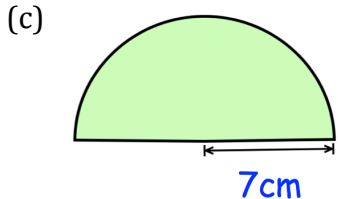
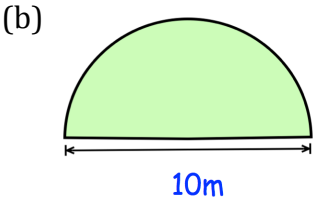
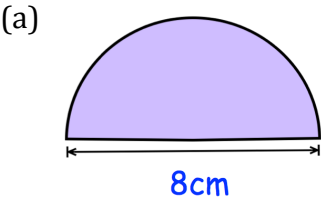


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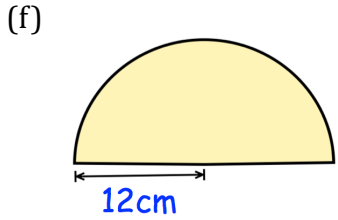
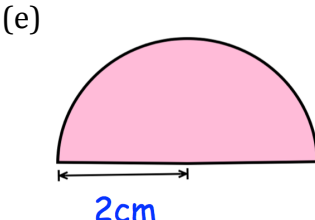
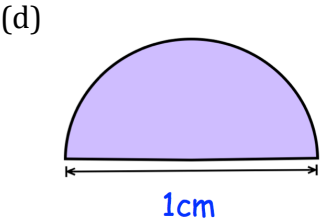
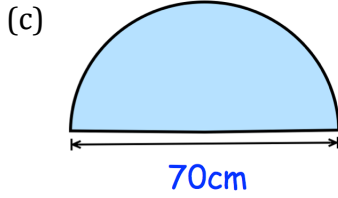
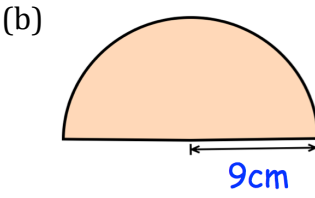
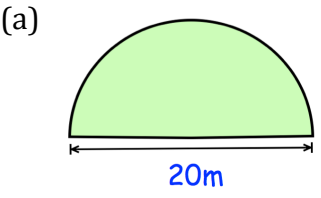


Scan here

Question 1: Calculate the perimeter of each of these semi-circles.
Give your answers to 1 decimal place and include suitable units.

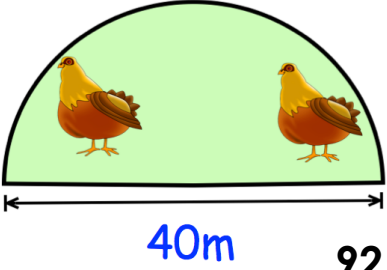


Question 2: Work out the perimeter of each of these semi-circles.
Give your answers in terms of π and include suitable units.



Apply

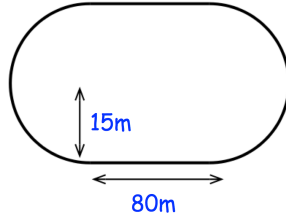
Question 1: Farmer Jones is building a pen for his chickens.
Each metre of fencing costs £3
Work out the total cost of building the pen.



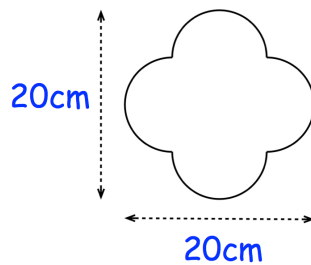
Perimeter: Semi-Circle

Video 62 on www.corbettmaths.com

Question 2: Newtown Primary School has a running track.
Calculate the distance around the running track.

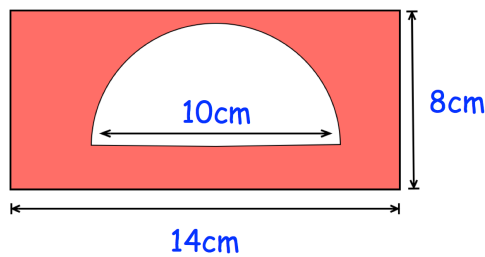


Question 3: Calculate the perimeter of this shape



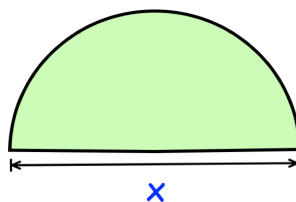
Question 4: Jamie makes a picture frame by cutting a semi-circle out of a rectangular piece of wood. The picture will be placed in the semi-circular region.

Jamie wants to put gold trim around entire picture frame and also around the picture. What length of gold trim does Jamie need?



Question 5: A semi-circle has a perimeter of 80cm.
Calculate x

Perimeter = 80cm



Answers



Examples



Click here

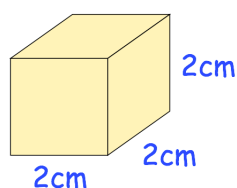


Scan here

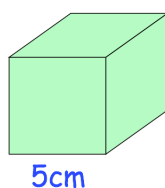
Workout

Question 1: Work out the surface area of each of the following cubes.

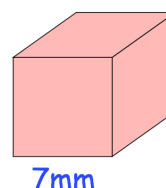
(a)



(b)

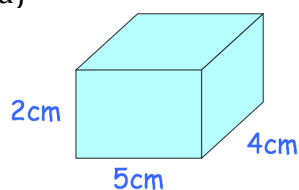


(c)

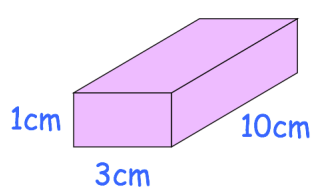


Question 2: Work out the surface area of each of the following cuboids.

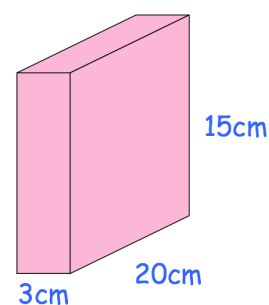
(a)



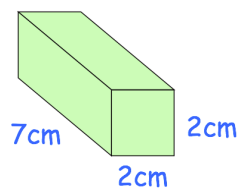
(b)



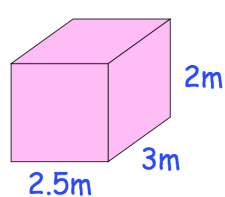
(c)



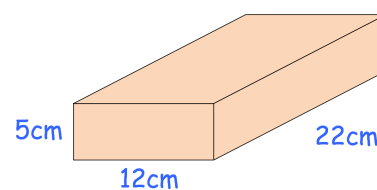
(d)



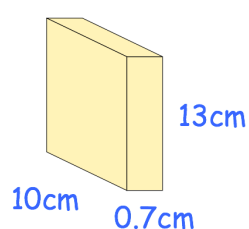
(e)



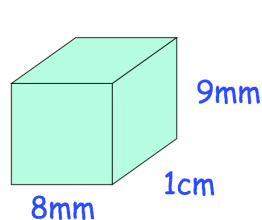
(f)



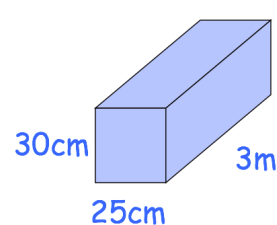
(g)



(h)



(i)

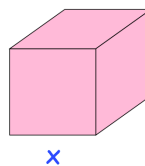


Question 3: Calculate the surface area of a cube with side length 12cm

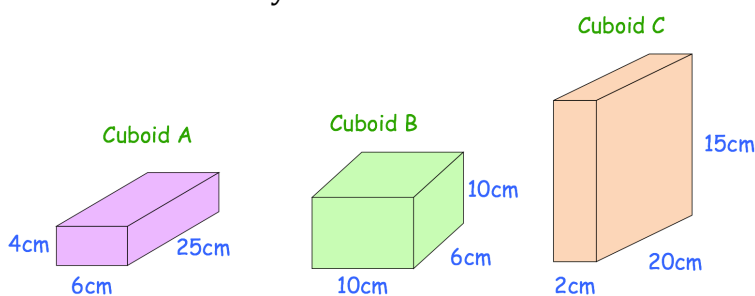
Question 4: Calculate the surface area of a cube with side length $\frac{1}{2}$ cm

Apply

Question 1: A cube has a surface area of 54cm^2
Find the side length, x , of the cube



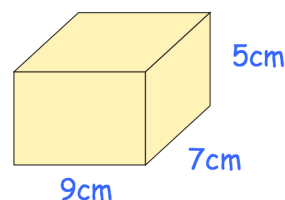
Question 2: A company is designing a new box to hold coffee.
They have 3 designs, cuboids A, B and C.
All 3 designs have the same volume of 600cm^3
The company want to choose the design with the smallest surface area.
Which cuboid should they choose?



Question 3: A cube has a volume of 1000cm^3 .
Work out the surface area of the cube.

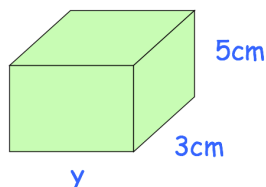
Question 4: Jamie is trying to work out the surface area of the cuboid below.
Can you spot any mistakes?

$$\begin{aligned} 9 \times 5 &= 45 \\ 7 \times 5 &= 35 \\ 9 \times 7 &= 63 \\ 45 + 35 + 63 &= 143\text{cm}^3 \end{aligned}$$

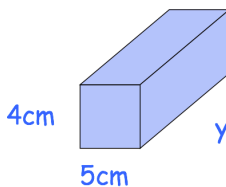


Question 5: Find y for each of the cuboids below

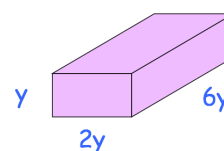
(a) Surface area = 158cm^2



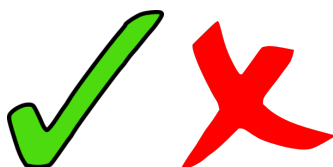
(b) Surface area = 346cm^2



(c) Surface area = 90cm^2



Answers



Click here



Scan here

Surface Area: L-shaped Prism

Video 311 on Corbettmaths

Examples



Click here

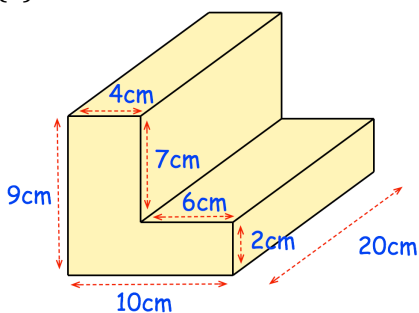


Scan here

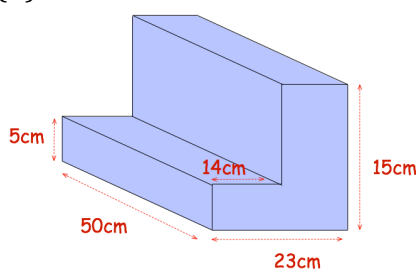
Workout

Question 1: Work out the surface area of each of the prisms below.

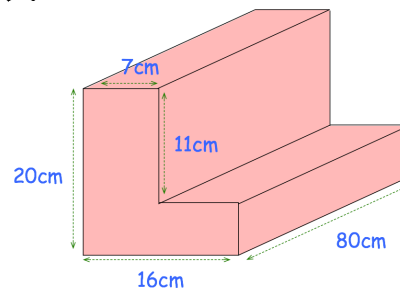
(a)



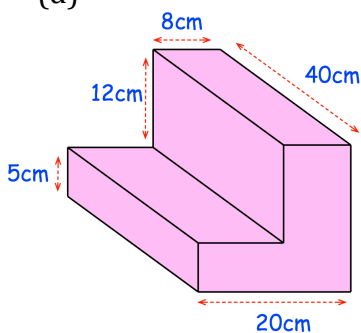
(b)



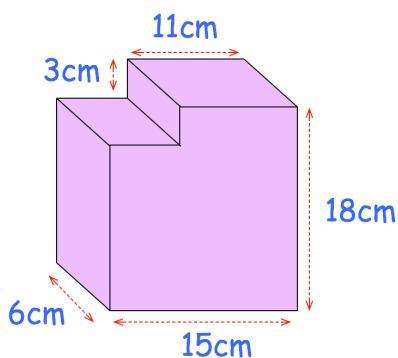
(c)



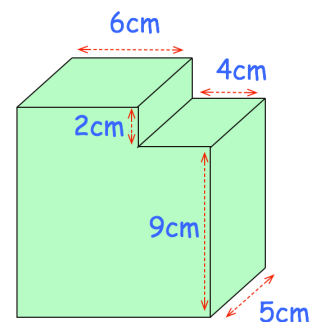
(d)



(e)

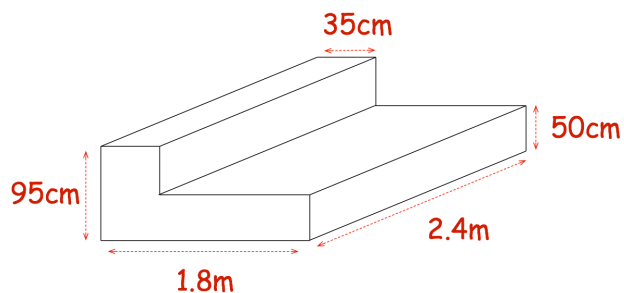


(f)



Apply

Question 1: Shown below is a prism.
Find the surface area of the prism.
Give your answer in m^2 .



Answers



Click here



Scan here

Examples



Click here

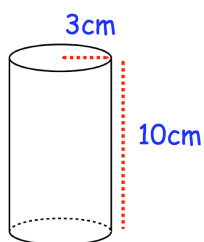


Scan here

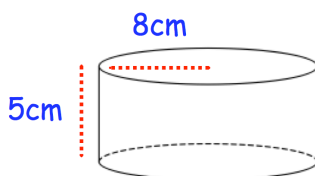
Workout

Question 1: Work out the surface area of each of the following cylinders.
Give each answer to 2 decimal places.

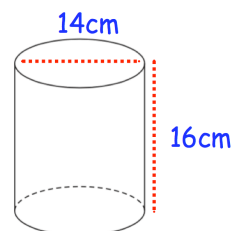
(a)



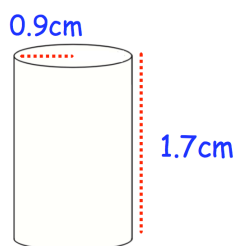
(b)



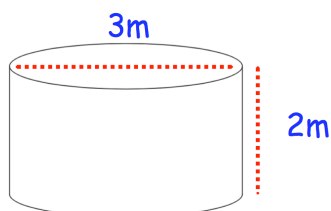
(c)



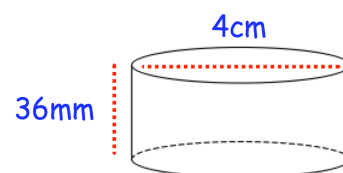
(d)



(e)

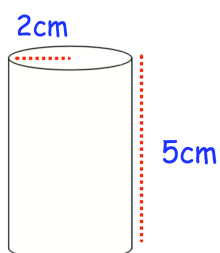


(f)

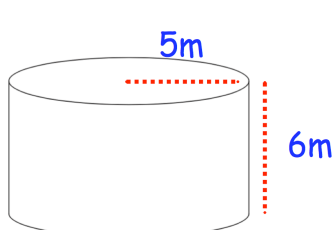


Question 2: Work out the surface area of each of the following cylinders.
Leave your answers in terms of π

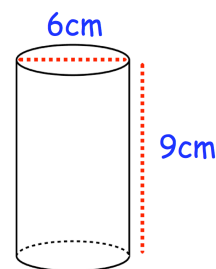
(a)



(b)

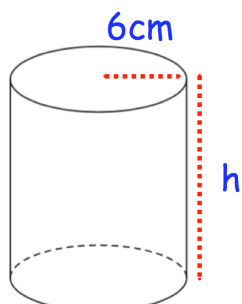


(c)



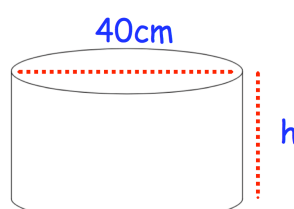
Question 3: Work out the height of each cylinder below

(a)



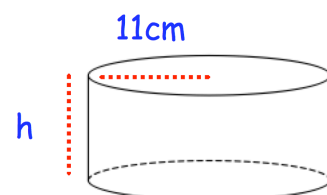
Surface area = 980.18cm^2

(b)



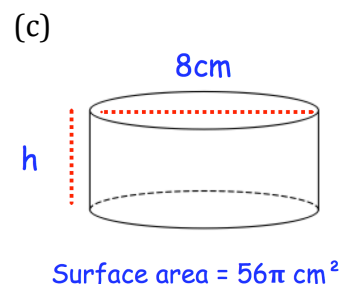
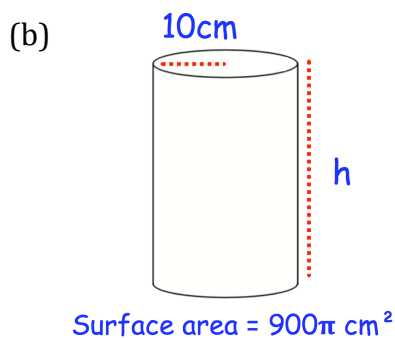
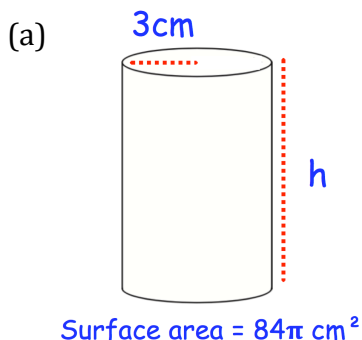
Surface area = 4715cm^2

(c)

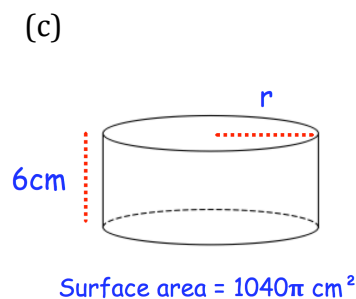
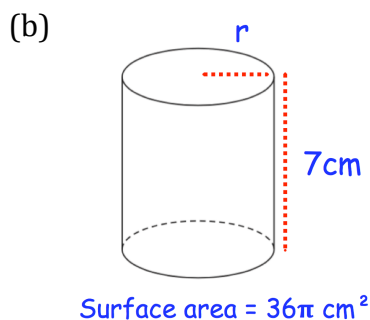
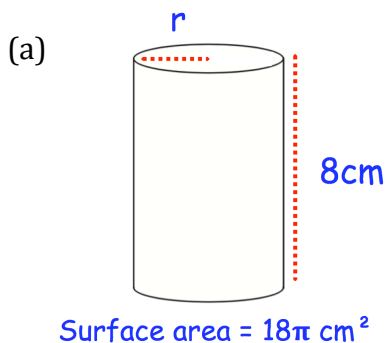


Surface area = 850cm^2

Question 4: Work out the height of each cylinder below

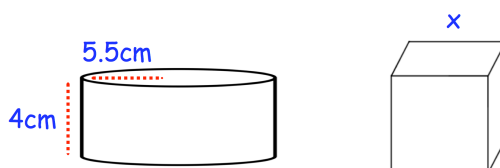


Question 5: Work out the radius of each cylinder below

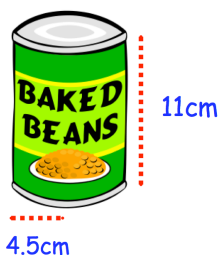


Apply

Question 1: The cylinder and cube below have the same surface area.
Find the side length of the cube, x .



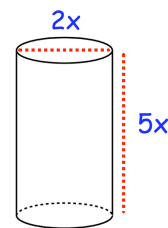
Question 2: A can of baked beans has a paper label wrapped around the outside. The can has a height of 11cm and radius of 4.5cm. The label covers the entire height of the can. The label has a 1cm overlap vertically so that it can be stuck together. Calculate the area of the label.



Surface Area: Cylinders

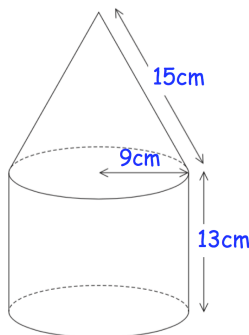
Video 315 on www.corbettmaths.com

Question 3: The cylinder below has a surface area of $972\pi \text{ cm}^2$.
Find x .

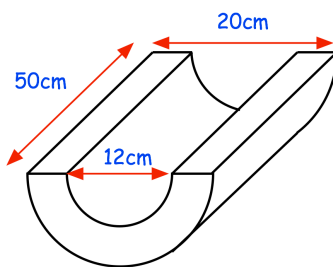


Question 4: A cylinder has a height of 18cm and volume of 1715cm^3 .
Work out the surface area of the cylinder.

Question 5: A cylinder and a cone are joined together to make a solid.
The cylinder has a radius of 9cm and height of 13cm .
The cone has a slant height of 15cm .
Find the total surface area of the solid.



Question 6: Work out the surface area of the shape below.



Answers



Click here



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Volume of a Cuboid

Video 355 on www.corbettmaths.com

Examples



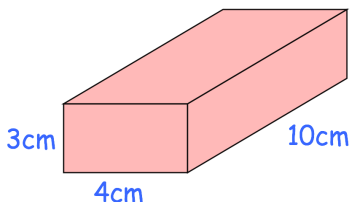
Workout

Click here

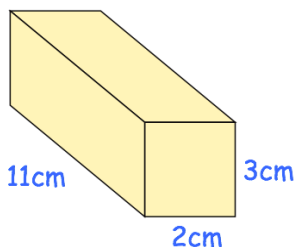
Scan here

Question 1: Work out the volume of each cuboid.
Include suitable units.

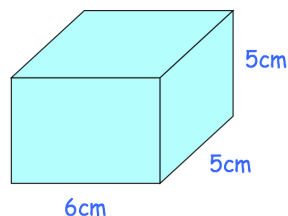
(a)



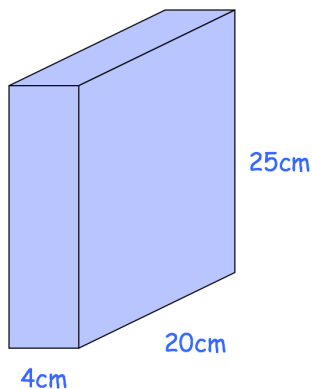
(b)



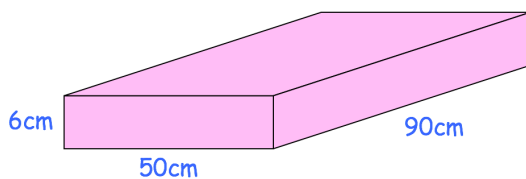
(c)



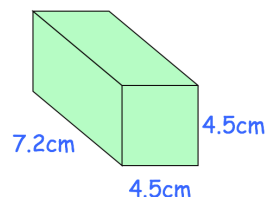
(d)



(e)

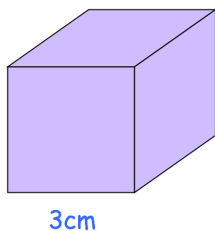


(f)

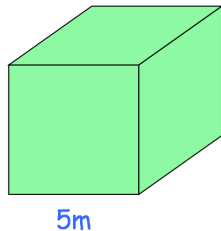


Question 2: Work out the volume of each cube.
Include suitable units.

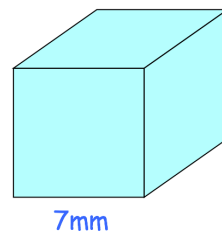
(a)



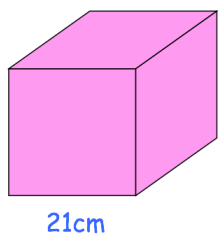
(b)



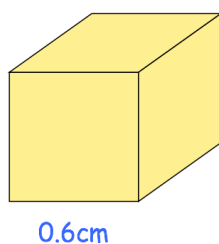
(c)



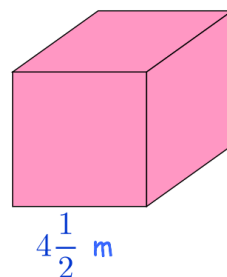
(d)



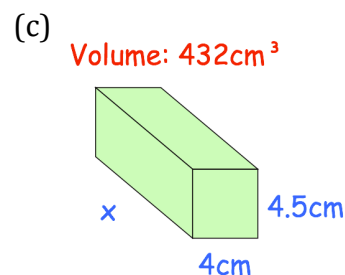
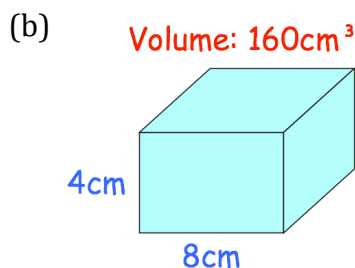
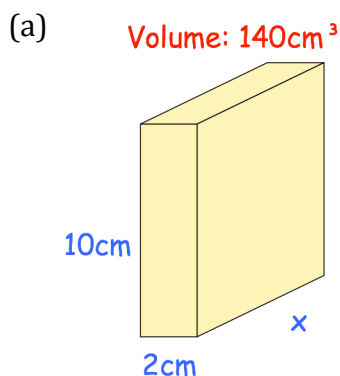
(e)



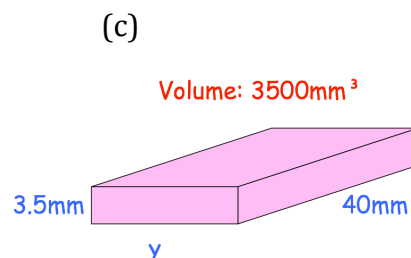
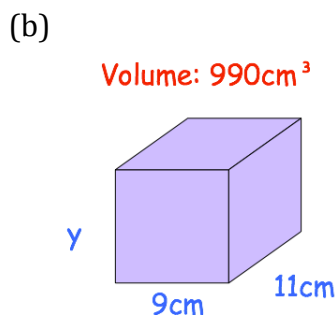
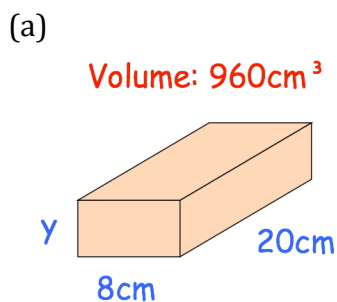
(f)



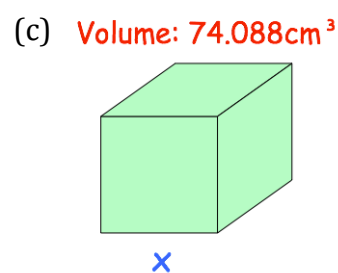
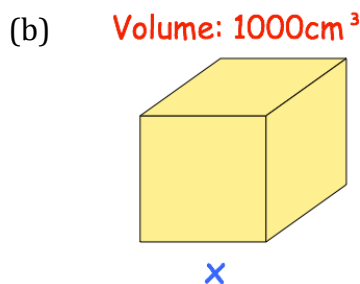
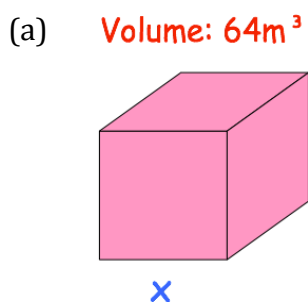
Question 3: Find the length of each cuboid.



Question 4: For each cuboid below, find the missing measurement, y.



Question 5: The volume of each cube is given.
Find the length of each side, x.



Apply

Question 1: Find the volume of a water tank that is 80cm long, 40cm wide and 20cm high.

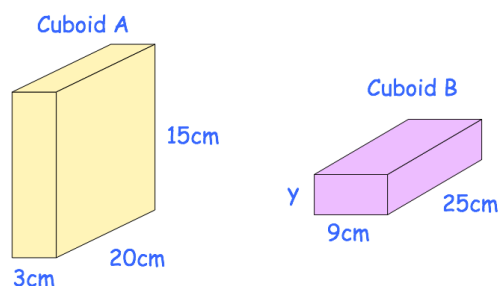
Question 2: A wooden beam measures 4 inches wide by 4 inches high by 60 inches long.
Work out the volume of the wooden beam.

Question 3: The cube on the TV show "The Cube" is a cube with each side measuring 4m.
Work out the volume of the cube.

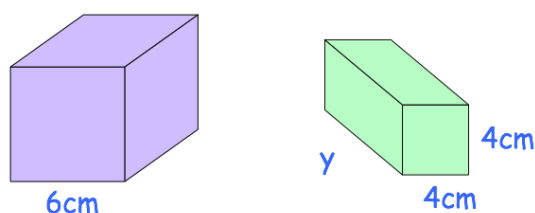
Volume of a Cuboid

Video 355 on www.corbettmaths.com

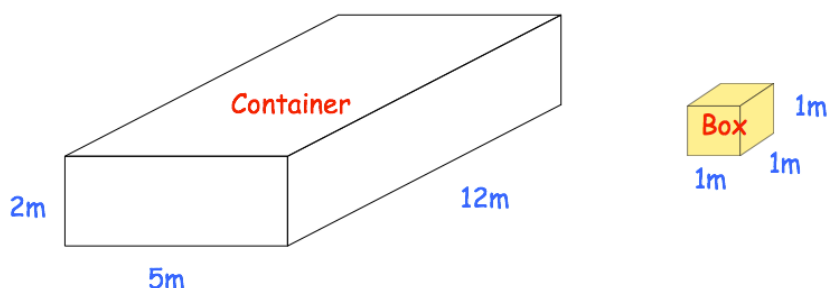
Question 4: Both cuboids below have the same volume.
Find the height of cuboid B.



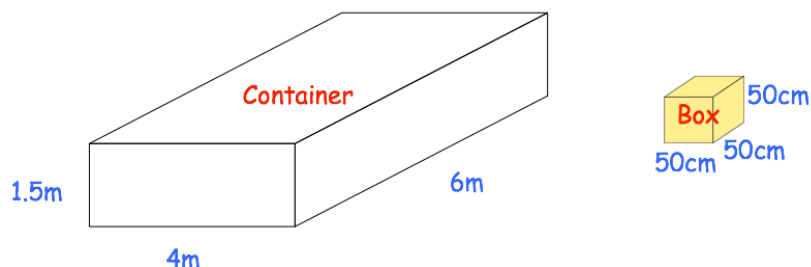
Question 5: The volume of the cube is twice the volume of the cuboid.
Find the length of the cuboid.



Question 6: The cuboid container below is used to store boxes.
Each box is a cube with side length 1m.
How many boxes can be stored in the container?



Question 7: The cuboid container below is used to store boxes.
Each box is a cube with side length 50cm.
How many boxes can be stored in the container?

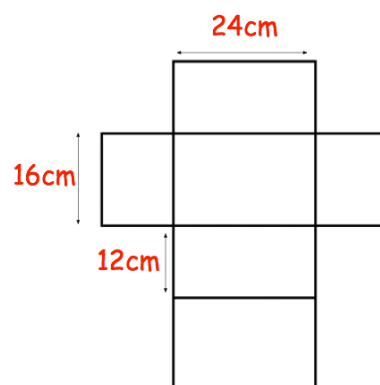


Question 8: An empty swimming pool is going to be filled with water.
The swimming pool is a cuboid, that is 25 metres long, 10 metres wide and 2 metres deep.
It is being filled at a rate of 800 litres per minute
Given $1\text{m}^3 = 1000$ Litres, how long it will take to fill the swimming pool?
Give your answer in hours and minutes.

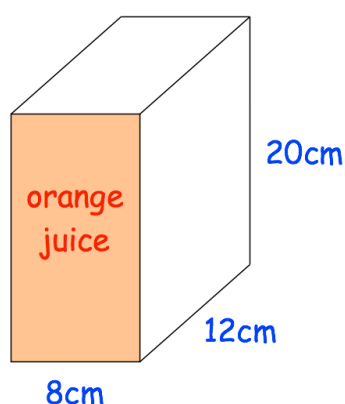
Volume of a Cuboid

Video 355 on www.corbettmaths.com

Question 9: Shown is a net of a cuboid.
Calculate the volume of the cuboid.



Question 10: A carton of orange juice is shown below.
The carton is in the shape of a cuboid.



The depth of the orange juice is 6cm.

The carton is turned so that it stands the shaded (orange) face.

Work out the depth of the orange juice now.

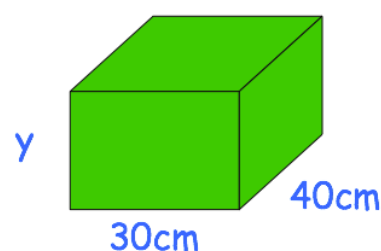
Question 11: Peter is making green paint by mixing blue and yellow paint in a cuboid container, shown below.

The container has a width of 30cm and length of 40cm and is full.

He mixes blue paint and yellow paint in the ratio 2:3.

Peter uses 8.4 litres of blue paint.

Calculate the height of the container.



Answers



Click here



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Volume of a Prism

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Examples



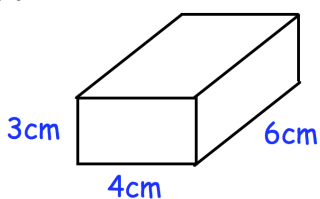
Workout

Click here

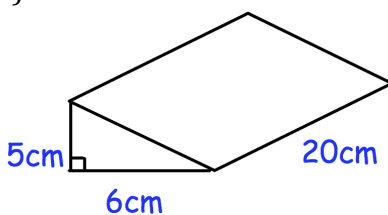
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Question 1: Calculate the volume of each prism below

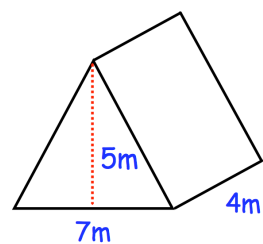
(a)



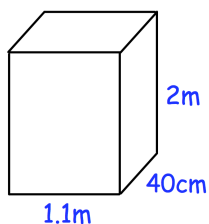
(b)



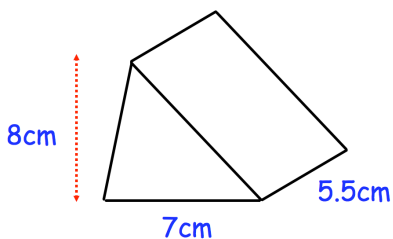
(c)



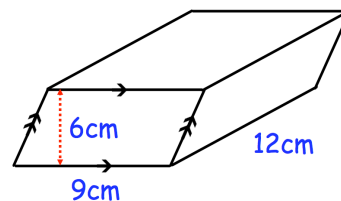
(d)



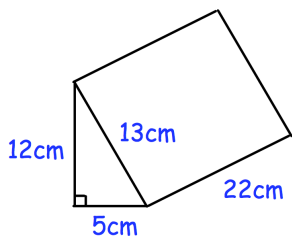
(e)



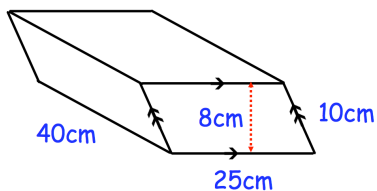
(f)



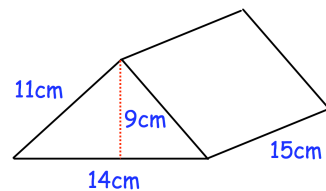
(g)



(h)

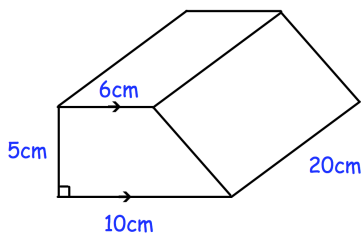


(i)

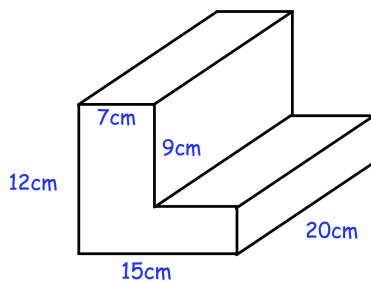


Question 2: Calculate the volume of each prism below

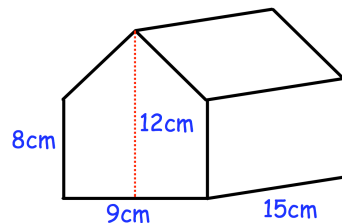
(a)



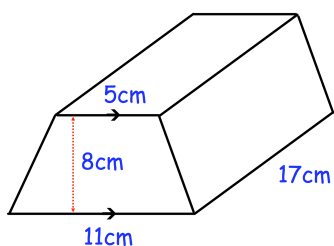
(b)



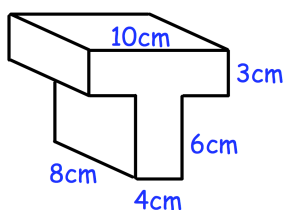
(c)



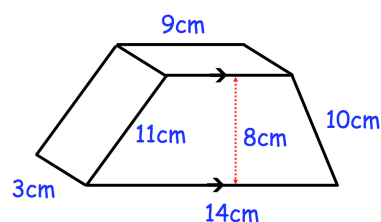
(d)



(e)



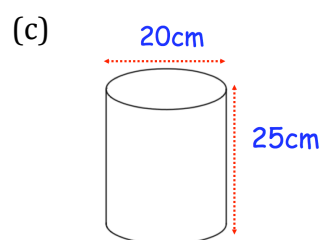
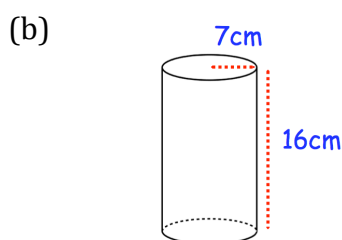
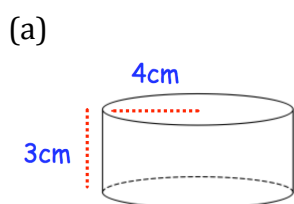
(f)



Volume of a Prism

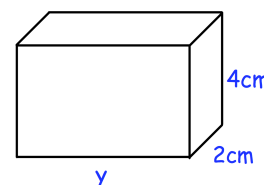
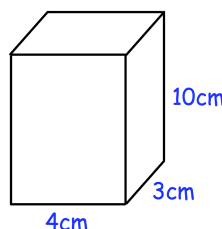
Video 356 on www.corbettmaths.com

Question 3: Calculate the volume of each cylinder below

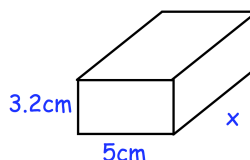
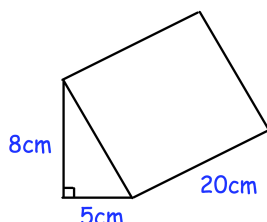


Apply

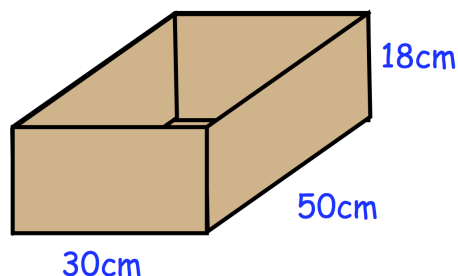
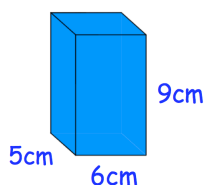
Question 1: Cillian makes two cuboids out of clay. Both cuboids have the same volume. Find y



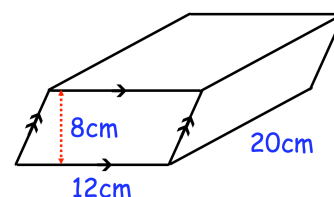
Question 2: The cuboid and the triangular prism have the same volume. Find x .



Question 3: Boxes of coffee are placed into a crate. Each box of coffee is a cuboid and the crate is also a cuboid. How many boxes of coffee fit into the crate?



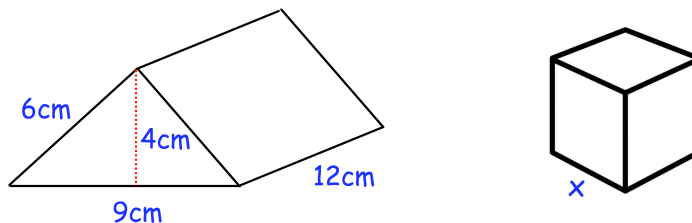
Question 4: James wants to fill an empty flowerpot with soil. He has 2 litres of soil. Given $1 \text{ litre} = 1000\text{cm}^3$. Does James have enough soil to fill the flowerpot?



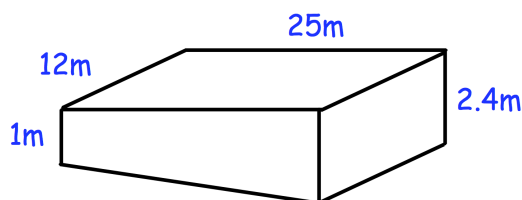
Volume of a Prism

Video 356 on www.corbettmaths.com

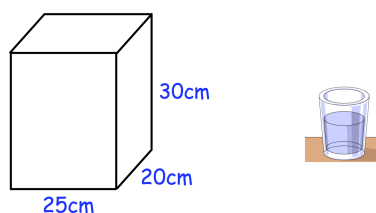
Question 5: The solid triangular prism shown below is made from metal. The prism is melted down and the metal is used to create a solid cube. Find the side length of the cube.



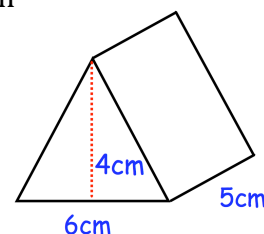
Question 6: The swimming pool in a leisure centre is shown below. The length of the swimming pool is 25m and the width is 12m. The depth of the shallow end is 1m and the depth of the deep end is 2.4m. Given $1\text{m}^3 = 1000$ litres. Work out how much water, in litres, the swimming pool holds.



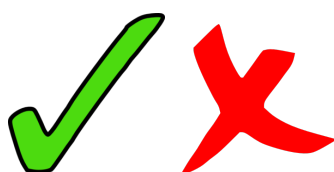
Question 7: A fish tank is $\frac{1}{4}$ full of water. Harry pours a 400ml glass of water into the fish tank. Given $1\text{ml} = 1\text{cm}^3$. What will the depth of the water of the fish tank then be?



Question 8: A solid glass paperweight is in the shape of a triangular prism. The density of the glass is 2.4g/cm^3 . Work out the mass of the paperweight.



Answers



Click here



Scan here

Volume of a Cylinder

Video 357 on www.corbettmaths.com

Examples



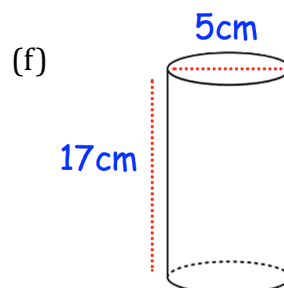
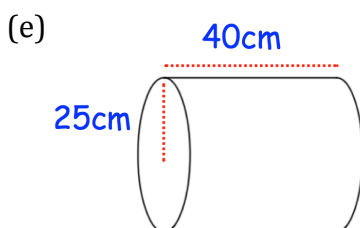
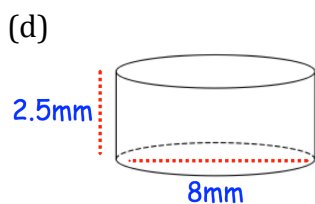
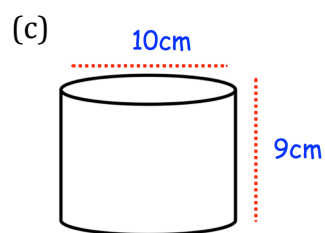
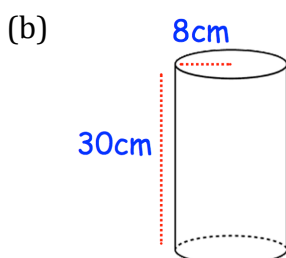
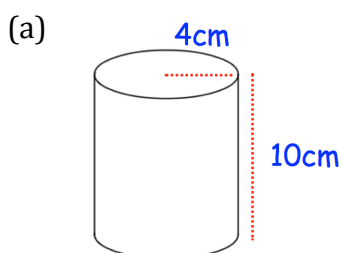
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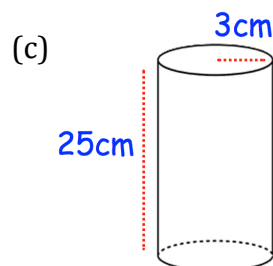
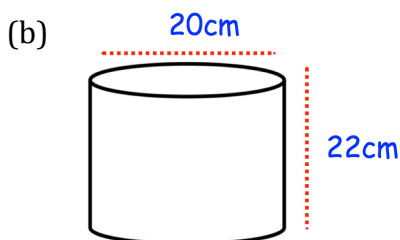
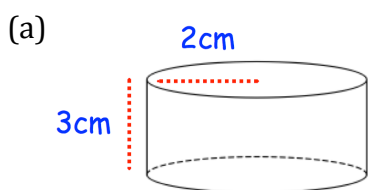
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Workout

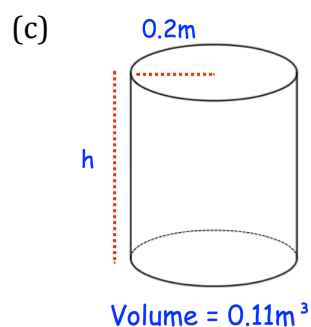
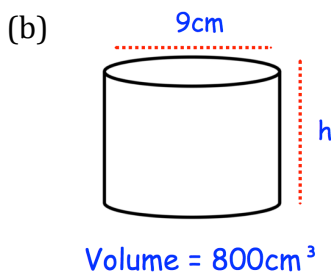
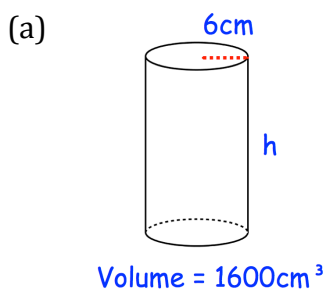
Question 1: Work out the volume of each cylinder.
Give each answer to one decimal place.



Question 2: Work out the volume of each cylinder.
Give each answer in terms of π .



Question 3: Work out the height of each cylinder.
Give each answer to one decimal place.

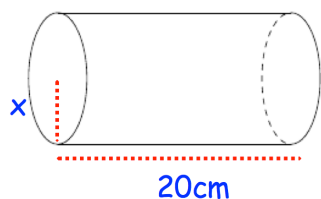


Volume of a Cylinder

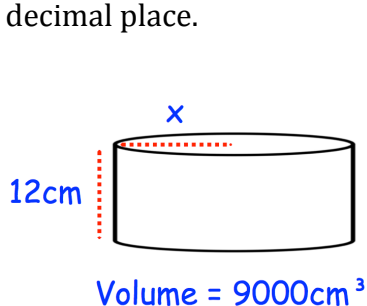
Video 357 on www.corbettmaths.com

Question 4: Work out the value of x .
Give each answer to one decimal place.

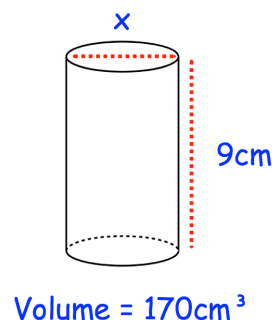
(a) Volume = 725cm^3



(b)



(c)



Apply

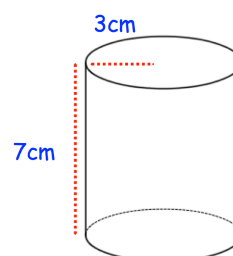
Question 1: A cylindrical oil drum has a diameter of 48cm and a height of 92cm .
Calculate the volume of the oil drum.



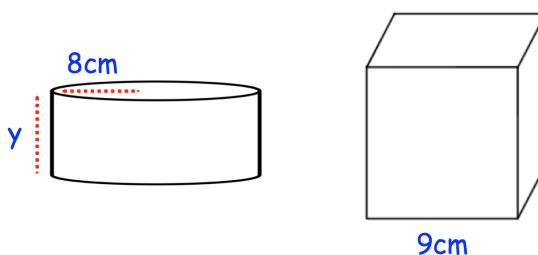
Question 2: A cylinder has a radius of 2m and a height of 5m .
Work out the volume of the cylinder in terms of π .

Question 3: Timothy is filling cups with orange juice.
Each cup is a cylinder with radius 3cm and height 7cm .
Timothy has 2 litres of orange juice.
 1 litre = 1000cm^3

How many cups can be filled?



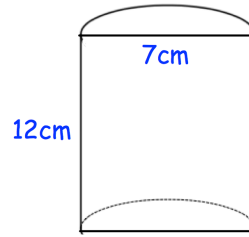
Question 4: Shown below is a cylinder and a cube.
The volume of the cylinder is equal to the volume of the cube.
Find y .



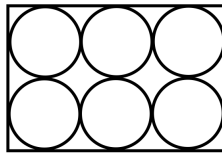
Volume of a Cylinder

Video 357 on www.corbettmaths.com

Question 5: Calculate the volume of this shape.

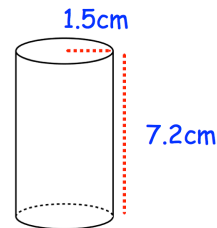


Question 6: 6 cylinders are placed in a crate as shown below.
The radius of each cylinder is 4cm and the height of each cylinder is 14cm.
The crate also has a height of 14cm.



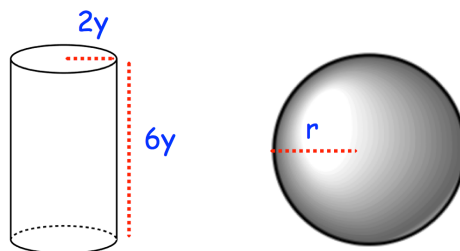
What percentage of space in the crate is empty?

Question 7: A solid glass cylinder has a radius of 1.5cm and a height of 7.2cm.
The density of the glass is 2.61g/cm^3
Work out the mass of the cylinder.

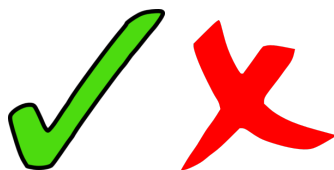


Question 8: The diagram shows a solid cylinder.
The cylinder has radius of $2y$ and height of $6y$.
The cylinder is melted down and made into a sphere of radius r .

Express r in terms of y .



Answers



Click here

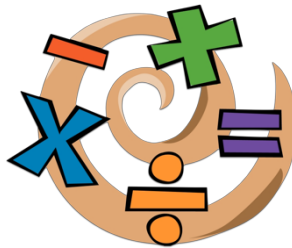


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St Andrew's Academy

Mathematics Department



BLOCK EIGHT

Number	Algebra	Shape and Angles
<ul style="list-style-type: none">• Multiplying Fractions.• Dividing Fractions.• Multiply and Divide mixed numbers.	<ul style="list-style-type: none">• Factorising using common factor.• Factorising quadratics.	<ul style="list-style-type: none">• Properties of 2D and 3D shapes.• Types of Angles.• Naming Angles using letters.• Draw and Measure Angles.• Angles in a triangle.• Supplementary and complementary angles.• Vertically opposite, corresponding and alternate angles, including parallel lines.

Examples

Workout



Click here



Scan here

Question 1: Work out each of the following multiplications.
Give each answer in its simplest form.

(a) $\frac{1}{2} \times \frac{1}{5}$

(b) $\frac{1}{2} \times \frac{3}{4}$

(c) $\frac{1}{4} \times \frac{3}{5}$

(d) $\frac{1}{3} \times \frac{1}{3}$

(e) $\frac{5}{6} \times \frac{1}{2}$

(f) $\frac{3}{4} \times \frac{1}{4}$

(g) $\frac{2}{3} \times \frac{1}{7}$

(h) $\frac{5}{8} \times \frac{1}{3}$

(i) $\frac{2}{3} \times \frac{1}{2}$

(j) $\frac{1}{3} \times \frac{3}{4}$

(k) $\frac{3}{10} \times \frac{1}{2}$

(l) $\frac{2}{5} \times \frac{1}{4}$

(m) $\frac{2}{7} \times \frac{3}{4}$

(n) $\frac{5}{7} \times \frac{1}{10}$

(o) $\frac{7}{12} \times \frac{2}{3}$

(p) $\frac{6}{7} \times \frac{2}{3}$

(q) $\frac{6}{7} \times \frac{2}{9}$

(r) $\frac{3}{10} \times \frac{5}{6}$

(s) $\frac{6}{15} \times \frac{3}{4}$

(t) $\frac{3}{5} \times \frac{11}{15}$

(u) $\frac{9}{20} \times \frac{10}{11}$

(v) $\frac{21}{30} \times \frac{2}{3}$

(w) $\frac{12}{25} \times \frac{5}{8}$

(x) $\frac{8}{9} \times \frac{3}{16}$

Question 2: Work out the following multiplications
Give your answers as simplified fractions.
If any answers are top heavy fractions, write as mixed numbers.

(a) $\frac{1}{5} \times 3$

(b) $7 \times \frac{1}{8}$

(c) $\frac{1}{10} \times 4$

(d) $30 \times \frac{1}{2}$

(e) $8 \times \frac{3}{4}$

(f) $\frac{2}{3} \times 12$

(g) $5 \times \frac{1}{3}$

(h) $8 \times \frac{2}{5}$

(i) $\frac{4}{5} \times 20$

(j) $\frac{2}{7} \times 8$

(k) $8 \times \frac{5}{4}$

(l) $\frac{1}{5} \times 360$

Question 3: Work out the following divisions.
Give your answers as simplified fractions.
If any answers are top heavy fractions, write as mixed numbers.

(a) $1\frac{2}{3} \times \frac{1}{4}$ (b) $\frac{2}{5} \times 1\frac{1}{4}$ (c) $\frac{3}{4} \times 1\frac{1}{2}$ (d) $2\frac{1}{2} \times \frac{7}{10}$

(e) $\frac{1}{4} \times 3\frac{1}{3}$ (f) $1\frac{2}{3} \times 1\frac{1}{4}$ (g) $4\frac{3}{5} \times 1\frac{2}{3}$ (h) $1\frac{2}{11} \times \frac{8}{9}$

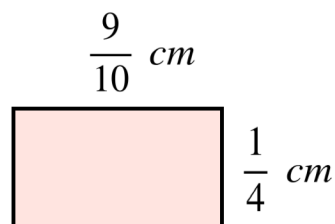
(i) $2\frac{5}{6} \times 2\frac{1}{5}$ (j) $1\frac{1}{9} \times 3\frac{3}{10}$ (k) $3\frac{1}{8} \times 2\frac{1}{2}$ (l) $2\frac{6}{7} \times 3\frac{1}{5}$

Apply

Question 1: Work out $\frac{4}{5} \times 1\frac{1}{2} \times \frac{7}{8}$

Question 2: Work out the missing number $\square \div \frac{7}{15} = \frac{2}{3}$

Question 3: Find the area of this rectangle.
Include suitable units.



Question 4: Alexis has a pet dog, Maxi.

Each day, Maxi eats $\frac{2}{3}$ of a can of dog food.

Alexis is buying dog food for one week.

How many cans of dog food should Alexis buy?



Multiplying Fractions

Video 142 on www.corbettmaths.com

Question 5: Kelly spends $\frac{1}{4}$ of her savings on driving lessons.
 Kelly then spends $\frac{2}{3}$ of her remaining savings on a new car.
 What fraction of her savings has Kelly spent?

Question 6: Work out

$$\frac{9}{10} + \left(\frac{5}{7}\right)^2$$

Question 7: A wall measures $3\frac{3}{4}m$ by $4\frac{1}{3}m$

Each can of paint cover $2.5m^2$ and costs £5.50



Work out the cost of painting the wall.

Question 8: Callum has completed his maths homework.
 Can you spot any mistakes?

Work out

$$\frac{1}{3} \times \frac{1}{6}$$

$$\frac{2}{18} = \frac{1}{9}$$

Work out

$$1\frac{3}{10} \times 2\frac{1}{2}$$

$$\frac{13}{10} \times \frac{5}{2} = \frac{75}{20}$$

$$60\frac{15}{20}$$

$$60\frac{3}{4}$$

Answers



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Examples

Workout



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Question 1: Work out the following divisions.
Give your answers as simplified fractions.
If any answers are top heavy fractions, write as mixed numbers.

(a) $\frac{1}{5} \div \frac{2}{3}$ (b) $\frac{3}{4} \div \frac{4}{5}$ (c) $\frac{1}{2} \div \frac{7}{8}$ (d) $\frac{2}{3} \div \frac{5}{6}$

(e) $\frac{1}{10} \div \frac{4}{9}$ (f) $\frac{6}{11} \div \frac{5}{6}$ (g) $\frac{2}{5} \div \frac{13}{15}$ (h) $\frac{3}{8} \div \frac{7}{9}$

(i) $\frac{3}{5} \div \frac{1}{2}$ (j) $\frac{7}{9} \div \frac{2}{3}$ (k) $\frac{8}{15} \div \frac{7}{10}$ (l) $\frac{9}{10} \div \frac{1}{3}$

(m) $\frac{5}{6} \div \frac{3}{4}$ (n) $\frac{13}{20} \div \frac{8}{11}$ (o) $\frac{4}{17} \div \frac{3}{16}$ (p) $\frac{5}{7} \div \frac{10}{19}$

Question 2: Work out the following divisions
Give your answers as simplified fractions.
If any answers are top heavy fractions, write as mixed numbers.

(a) $\frac{3}{4} \div 2$ (b) $\frac{4}{7} \div 8$ (c) $\frac{11}{20} \div 3$ (d) $\frac{9}{40} \div 5$

(e) $4 \div \frac{2}{3}$ (f) $2 \div \frac{3}{4}$ (g) $12 \div \frac{2}{3}$ (h) $5 \div \frac{2}{9}$

Question 3: Work out the following divisions.
Give your answers as simplified fractions.
If any answers are top heavy fractions, write as mixed numbers.

(a) $\frac{2}{3} \div 1\frac{4}{5}$ (b) $1\frac{1}{2} \div 1\frac{9}{10}$ (c) $2\frac{3}{7} \div \frac{1}{2}$ (d) $2\frac{1}{3} \div 5\frac{1}{2}$

(e) $3 \div 2 \frac{1}{8}$ (f) $4 \frac{1}{3} \div 2 \frac{9}{10}$ (g) $6 \frac{5}{6} \div 2$ (h) $1 \frac{5}{12} \div 2 \frac{2}{11}$

Apply

Question 1: Work out the missing number $\frac{9}{11} \times \square = \frac{3}{4}$

Question 2: Work out

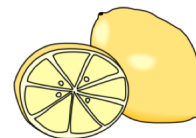
(a) $\frac{4}{5} \div \frac{3}{10} \div \frac{1}{8}$ (b) $\frac{7}{9} + \frac{1}{2} \div \frac{3}{5}$

Question 3: James shares $\frac{5}{8}$ of a cake between 6 people.
What fraction of the cake do they each receive?



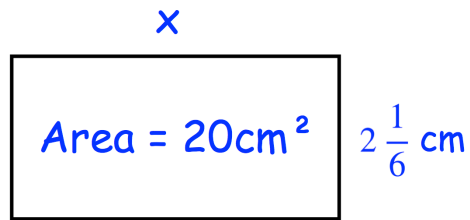
Question 4: John has 12 cans of dog food.
He has two dogs and he gives each dog $\frac{2}{3}$ of a can of dog food each day.
Does he have enough dog food to last one week?

Question 5: Alisha has $\frac{7}{8}$ litres of lemonade.
She is pouring glasses that each contain $\frac{1}{5}$ litres.
How many full glasses can she pour?



Question 6: Helen is cutting lengths of string from a roll that is $9 \frac{1}{3}$ metres long.
Each length of string is $\frac{1}{9}$ metres long.
How many lengths of string can Helen cut from the roll?

Question 7: Shown is a rectangle.
Find the value of x



Question 8: Lee has completed his homework.
Can you spot any mistakes?

Work out

$$\frac{2}{3} \div \frac{8}{11}$$

Give your answer as a fraction in its simplest form.

$$\begin{aligned} \frac{2}{3} \times \frac{8}{11} \\ = \frac{16}{33} \end{aligned}$$

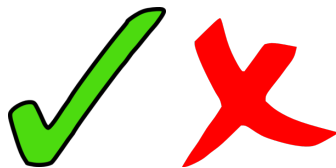
Work out

$$1\frac{4}{7} \div 1\frac{1}{4}$$

Give your answer as a mixed number.

$$\begin{aligned} \frac{11}{7} \div \frac{5}{4} \\ = \frac{11}{7} \times \frac{4}{5} = \frac{44}{35} \end{aligned}$$

Answers



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Examples



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Workout

Question 1: Find the reciprocal of each of the following

- (a) 2 (b) $\frac{1}{4}$ (c) $\frac{2}{3}$ (d) $\frac{3}{10}$ (e) $\frac{5}{2}$ (f) $\frac{1}{3}$
 (g) 5 (h) $\frac{4}{5}$ (i) $\frac{2}{9}$ (j) $\frac{20}{19}$ (k) $\frac{1}{12}$ (l) $\frac{13}{8}$
 (m) $\frac{4}{3}$ (n) 1

Question 2: Find the reciprocal of each of the following

- (a) $1\frac{1}{2}$ (b) $1\frac{7}{10}$ (c) $2\frac{1}{3}$ (d) $4\frac{2}{3}$ (e) $1\frac{4}{9}$ (f) $6\frac{5}{6}$

Question 3: Find the reciprocal of each of the following

- (a) 0.5 (b) 0.8 (c) 2.5 (d) 0.02 (e) 1.9 (f) 1.375

Apply

Question 1: Find the missing numbers

- (a) $\square \times \frac{1}{4} = 1$ (b) $\square \times 6 = 1$
 (c) $\frac{3}{4} \times \frac{4}{3} = \square$ (d) $\frac{2}{9} \times \square = 1$

Question 2: Michael says that the reciprocal of a number is always larger than the number. Show Michael is wrong.

Question 3: Helen is thinking of a number. She then writes the reciprocal of the number. It is the same as her starting number. What number did Helen think of?

Question 4: What number does not have a reciprocal?

Answers



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Workout

Question 1: Factorise the following expressions

- | | | | |
|-----------------|-----------------|------------------|-----------------------|
| (a) $4x + 6$ | (b) $15x + 20$ | (c) $9y - 12$ | (d) $5x + 15$ |
| (e) $6x - 3$ | (f) $4x + 8$ | (g) $5y - 25$ | (h) $8w + 24$ |
| (i) $10y + 15$ | (j) $14w + 21$ | (k) $20y - 30$ | (l) $27x + 18$ |
| (m) $6 - 4x$ | (n) $9 + 12y$ | (o) $45 + 60x$ | (p) $16y - 32$ |
| (q) $22a + 55$ | (r) $100 - 40y$ | (s) $6x + 9y$ | (t) $4w - 2a$ |
| (u) $25y - 35z$ | (v) $8x^2 + 20$ | (w) $30y^3 - 15$ | (x) $42y + 28x - 56c$ |

Question 2: Factorise the following expressions

- | | | | |
|-------------------|-------------------|-------------------|-------------------|
| (a) $x^2 + 7x$ | (b) $x^2 - 3x$ | (c) $y^2 + y$ | (d) $w^2 + 9w$ |
| (e) $x^2 - 7x$ | (f) $4w^2 + 10w$ | (g) $6x^2 - 8x$ | (h) $9y^2 - 6y$ |
| (i) $10c + c^2$ | (j) $5g - g^2$ | (k) $14x^2 + 35x$ | (l) $40x^2 - 50x$ |
| (m) $12x^2 + 18x$ | (n) $24x^2 - 18x$ | (o) $45y^2 + 60y$ | (p) $7w^2 + 2w$ |

Question 3: Factorise the following expressions

- | | | | |
|--------------------|----------------------|--------------------|---------------------------|
| (a) $x^2 + xy$ | (b) $a^2 - ab$ | (c) $xy + xz$ | (d) $ab + ac - ad$ |
| (e) $6c^2 - 4cd$ | (f) $10x^2 + 15xy$ | (g) $12ab + 18bc$ | (h) $8xy + 4y^2$ |
| (e) $7de - 9ce$ | (f) $24ab^2 + 28ac$ | (g) $30xy + 35xyz$ | (h) $4abc - 6a$ |
| (i) $8cdf + 10cde$ | (j) $7w^2 + 6w + wy$ | (k) $8ab^2 - 10ab$ | (l) $4xy^2 + 6xy + 2x^2y$ |
| (m) $6mn - 7m^2n$ | (n) $11g^2h + 22h^2$ | | |

Question 4: Factorise the following expressions

- | | | | |
|---------------------|-------------------|--------------------|---------------------|
| (a) $x^3 + 2x^2$ | (b) $5x^3 - x^2$ | (c) $8c^3 + 12c$ | (d) $10w^2 - 15w^3$ |
| (e) $32y^3 + 24y^2$ | (f) $12x^4 + 15x$ | (g) $4a^5 - 12a^2$ | (h) $8w^9 + w^7$ |

Apply

Question 1: Explain why $8x + 3y$ cannot be factorised.

Question 2: James has factorised an expression correctly.
His answer is $2(7y - 3)$.
What was the expression that he factorised?

Question 3: Alexandra is trying to factorise fully $15y + 30$.
Rebecca says the answer is $3(5y + 10)$
Victoria says the answer is $5(3y + 6)$
Alexandra says both Rebecca and Victoria are incorrect, why?

Question 4: Can you spot any mistakes?
Factorise

$$w^2 - 5w$$

$$\frac{w(w + 5)}{\dots\dots\dots(1)}$$

Question 5: Can you spot any mistakes?
Factorise completely

$$24x^2 + 20x$$

$$\frac{4(6x^2 + 5x)}{\dots\dots\dots(2)}$$

Question 6: Can you spot any mistakes?
Factorise completely

$$20a^2c + 30ac$$

$$\frac{5ac(4a^2 + 6)}{\dots\dots\dots(2)}$$

Examples

Workout



Click here



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Question 1: Factorise each of the following

- (a) $x^2 + 7x + 12$ (b) $x^2 + 6x + 8$ (c) $x^2 + 5x + 6$ (d) $x^2 + 8x + 7$
(e) $x^2 + 4x + 4$ (f) $x^2 + 8x + 15$ (g) $x^2 + 6x + 9$ (h) $x^2 + 11x + 28$
(i) $x^2 + 10x + 25$ (j) $x^2 + 12x + 20$ (k) $x^2 + 25x + 24$ (l) $x^2 + 11x + 24$
(m) $x^2 + 9x + 14$ (n) $x^2 + 23x + 60$ (o) $x^2 + 29x + 100$ (p) $x^2 + 20x + 51$

Question 2: Factorise each of the following

- (a) $x^2 + x - 12$ (b) $x^2 + 5x - 6$ (c) $x^2 + 3x - 10$ (d) $x^2 + 3x - 4$
(e) $x^2 + 2x - 48$ (f) $x^2 + 4x - 32$ (g) $x^2 + 2x - 35$ (h) $x^2 + 8x - 33$

Question 3: Factorise each of the following

- (a) $x^2 - 3x - 10$ (b) $x^2 - x - 20$ (c) $x^2 - 6x - 27$ (d) $x^2 - 2x - 3$
(e) $x^2 - x - 12$ (f) $x^2 - 4x - 12$ (g) $x^2 - 4x - 21$ (h) $x^2 - 6x - 55$

Question 4: Factorise each of the following

- (a) $x^2 - 6x + 9$ (b) $x^2 - 9x + 20$ (c) $x^2 - 9x + 14$ (d) $x^2 - 13x + 22$
(e) $x^2 - 9x + 8$ (f) $x^2 - 12x + 32$ (g) $x^2 - 15x + 36$ (h) $x^2 - 14x + 48$

Question 5: Factorise each of the following

- (a) $x^2 - 9x + 8$ (b) $x^2 + 24x + 23$ (c) $x^2 - 5x - 14$ (d) $x^2 - 7x + 12$
(e) $x^2 + 12x + 36$ (f) $x^2 - 2x - 63$ (g) $x^2 + 14x + 24$ (h) $x^2 + 17x + 60$
(i) $x^2 - 11x + 30$ (j) $x^2 - 4x - 32$ (k) $x^2 - 2x - 63$ (l) $x^2 - 16x - 17$
(m) $x^2 - 11x + 18$ (n) $x^2 - 13x + 22$ (o) $x^2 + 18x + 56$ (p) $x^2 - 21x + 110$

(q) $x^2 - 16x + 64$ (r) $x^2 + 22x + 121$ (s) $x^2 - x - 72$ (t) $x^2 - 3x - 18$

(u) $x^2 - 4x - 45$ (v) $x^2 - 16x + 63$

Question 6: Factorise each of the following

(a) $x^2 + 8x - 105$ (b) $x^2 - 18x - 88$ (c) $x^2 - 75x + 350$ (d) $x^2 + 22x + 96$

(e) $x^2 + 25x + 154$ (f) $x^2 - 55x - 300$ (g) $x^2 - 29x + 180$ (h) $x^2 - x - 210$

Apply

Question 1: A quadratic expression, $x^2 + ax + 20$, can be factorised.
Find all possible values for a.
a can be positive or negative.

Question 2: A quadratic expression, $x^2 + bx + 16$, can be factorised.
Find all possible values for b.
b can be positive or negative.

Question 3: A quadratic expression, $x^2 - 6x + c$, can be factorised.
Find three possible values for c.

Question 4: Andrew has completed his homework on factorising quadratics.
Can you spot any mistakes?

Factorise $x^2 + x - 6$

$(x - 3)(x + 2)$

Factorise $x^2 + 10x + 9$

$(x + 3)(x + 3)$

Factorise $x^2 - 7x + 12$

$(x + 5)(x + 2)$

Factorise $x^2 + 8x + 16$

$(x + 4)(x + 4)$

Answers



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2D Shapes

Video 1 on www.corbettmaths.com

Examples



Click here




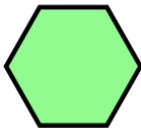

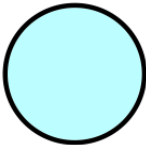
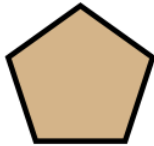

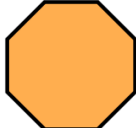
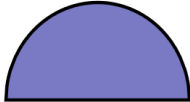
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Workout


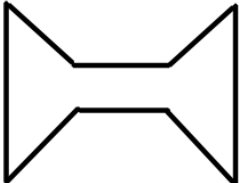
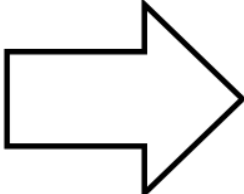
Question 1: Draw the following shapes

- (a) A square
- (b) A rectangle
- (c) A circle
- (d) A triangle
- (e) A semi-circle
- (f) A pentagon
- (g) An octagon
- (h) A hexagon
- (i) A decagon
- (j) A heptagon

Question 2: Name each of the shapes below

- (a) 
- (b) 
- (c) 
- (d) 
- (e) 
- (f) 
- (g) 
- (h) 

Question 3: Name each of the polygons below

- (a) 
- (b) 
- (c) 

2D Shapes

Video 1 on www.corbettmaths.com

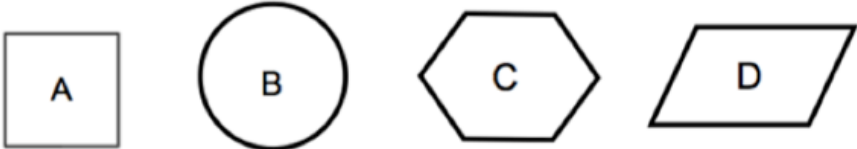
Apply

Question 1: Draw 4 different hexagons.

Question 2: Below is a picture of a street.
Write down any 2D shapes you see and what they are in the picture.



Question 3: Can you spot any mistakes below?



- (a) Name shape A
- (b) Name shape B
- (c) Name shape C
- (d) Name shape D

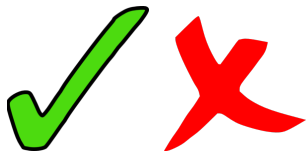
Square
.....
(1)

Circle
.....
(1)

Pentagon
.....
(1)

Diamond
.....
(1)

Answers



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Quadrilaterals

Video 2 on www.corbettmaths.com

Examples



Workout

Click here

Scan here

Question 1: Draw the following quadrilaterals

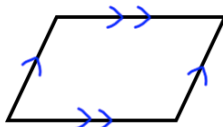
- (a) A kite (b) A rectangle (c) A square (d) A parallelogram
 (e) A trapezium (f) A rhombus (g) An arrowhead/A delta

Question 2: Name each of the shapes below

(a)



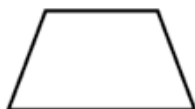
(b)



(c)



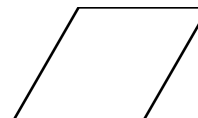
(d)



(e)



(f)



Question 3: Draw all lines of symmetry on the quadrilaterals you have drawn in Question 1.

Question 4: Write down the order of rotational symmetry that each quadrilateral below has:

- (a) A square (b) A rectangle (c) A kite (d) A parallelogram
 (e) A trapezium (f) A rhombus

Question 5: Which quadrilaterals have only one pair of equal length sides?

Question 6: Which quadrilaterals have two pairs of equal length sides?

Quadrilaterals

Video 2 on www.corbettmaths.com

Question 7: Which quadrilaterals have four equal length sides?

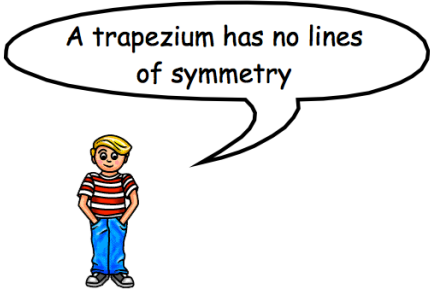
Question 8: Which quadrilaterals have two pairs of parallel sides?

Question 9: Which quadrilaterals have one pair of parallel sides?

Question 10: Which quadrilaterals have diagonals of equal length?

Apply

Question 1: Explain why Martin is incorrect.



Question 2: Can you spot any mistakes?

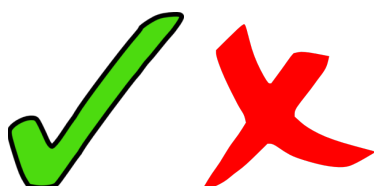
Below is a rectangle.



Tick the correct boxes for the four statements.

	True	False
A rectangle has four right angles	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A rectangle has one pair of parallel lines	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A rectangle has four lines of symmetry	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A rectangle has rotational symmetry of order 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Answers



Click here



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Examples



Workout

Click here

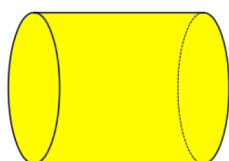
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Question 1: Draw the following 3D shapes

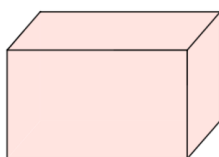
- (a) A cube (b) A cuboid (c) A sphere
(d) A cylinder (e) A triangular prism (f) A cone
(g) A square-based pyramid (h) A tetrahedron/triangular-based pyramid

Question 2: Name each of the 3D shapes below

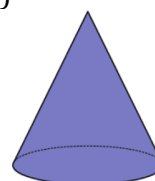
(a)



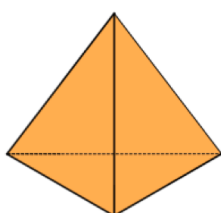
(b)



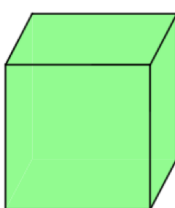
(c)



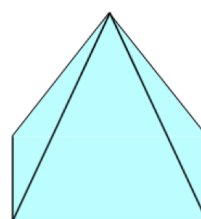
(d)



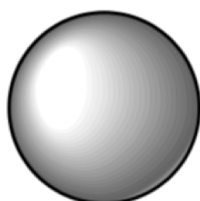
(e)



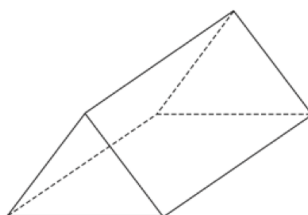
(f)



(g)



(h)



3D Shapes

Video 3 on www.corbettmaths.com

Apply

Question 1: Below is a picture of some objects.
Write down any 3D shapes you see and what they are in the picture.

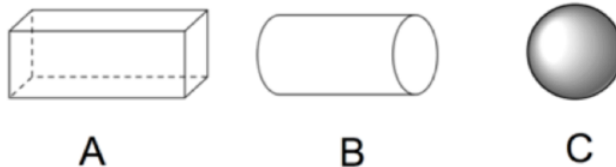


Question 2: Can you spot any mistakes below?

The names of five solid shapes are given.

triangular prism sphere cube cuboid cylinder

Three of them are drawn below.



Complete these statements.


Shape A is called a **Cube**

Shape B is called a **Cylinder**

Shape C is called a **Sphere**

Extension Task

Go on a 3D shape hunt around the classroom, the playground or at home.
Take photographs of any 3D shapes you can find.



Answers



Click here



Scan here

Examples



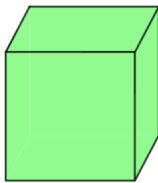
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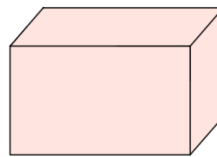
Workout

Question 1: For each 3D shape below, write down how many edges, faces and vertices it has.

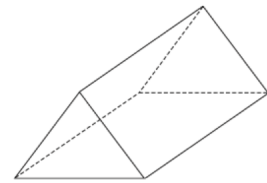
(a)



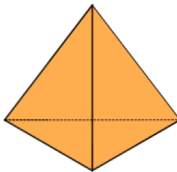
(b)



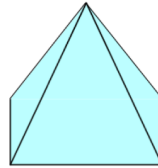
(c)



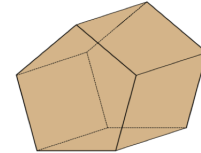
(d)



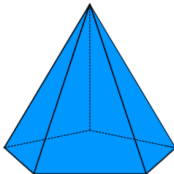
(e)



(f)



(g)



Apply

Question 1: Can you spot any mistakes in the question below?

	Faces	Edges	Vertices
Cube	12	6	8
Square-based Pyramid	5	5	5
Triangular Prism	9	9	6

Answers



Click here



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Nets
Video 4 on www.corbettmaths.com

Examples



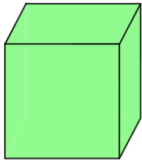
Workout

Click here

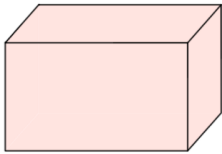
Scan here

Question 1: Draw the nets for these 3D shapes

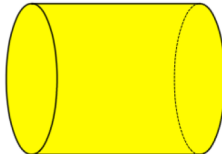
(a)



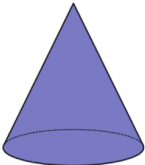
(b)



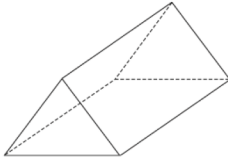
(c)



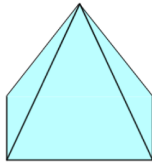
(d)



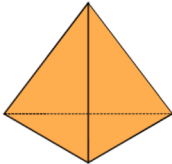
(e)



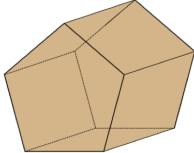
(f)



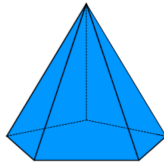
(g)



(h)

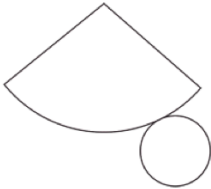


(i)

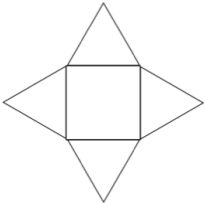


Question 2: Below are nets for various 3D shapes. Name the 3D shapes.

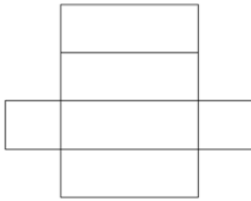
(a)



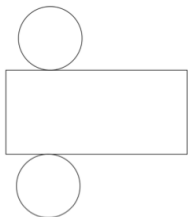
(b)



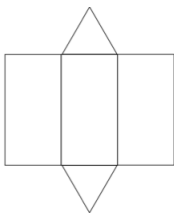
(c)



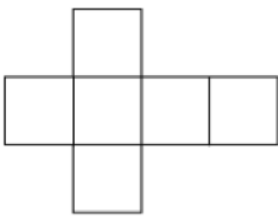
(d)



(e)



(f)

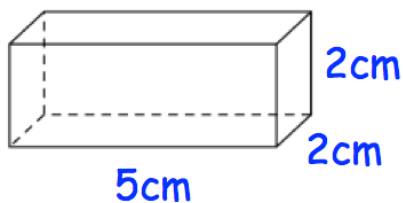


Nets

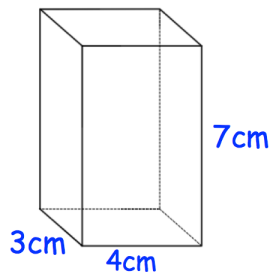
Video 4 on www.corbettmaths.com

Question 3: Draw accurate nets for these 3D shapes on squared paper.

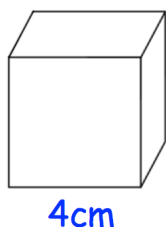
(a)



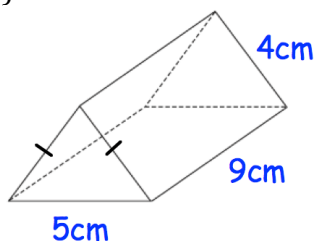
(b)



(c)

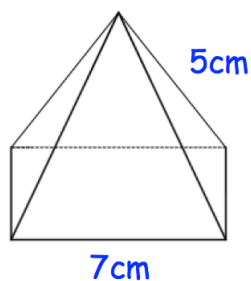


(d)

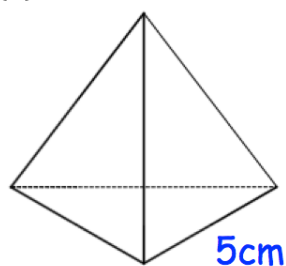


Question 4: Shown below is a square-based pyramid and a tetrahedron. Draw accurate nets for these 3D shapes on squared paper.

(a)

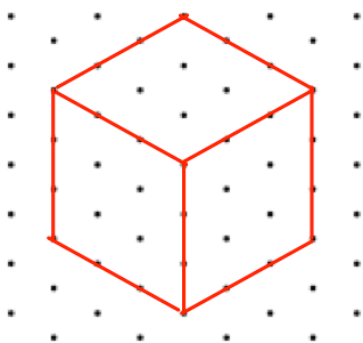


(b)

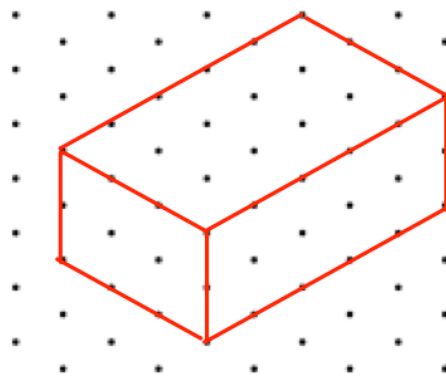


Question 5: The solids on 1cm isometric grids. Draw their nets on squared paper.

(a)



(b)

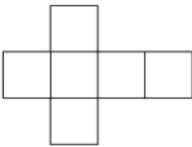


Nets

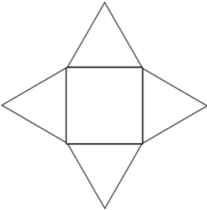
Video 4 on www.corbettmaths.com

Apply

Question 1: Shown below is a net for a cube. Draw all the other possible nets for a cube.

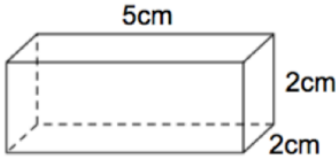


Question 2: Shown below is a net for a square-based pyramid. Draw all other possible nets for a square-based pyramid.



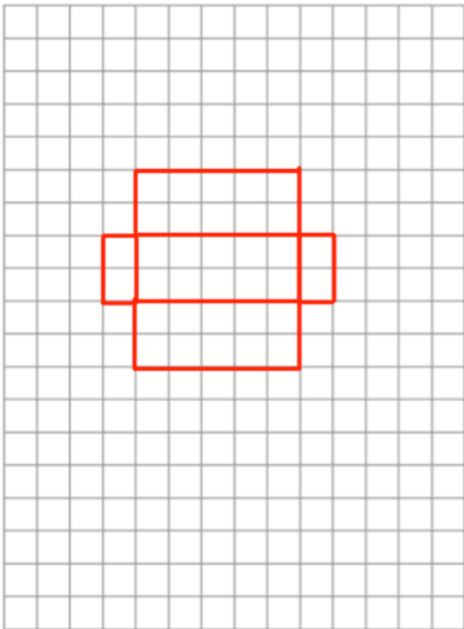
Question 3: Can you spot any mistakes below?

Shown below is a cuboid.

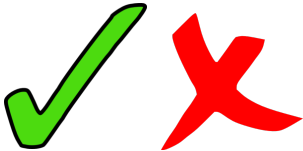


Draw a net for the cuboid.

Each square represents 1cm²



Answers



Click here



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Examples

Workout

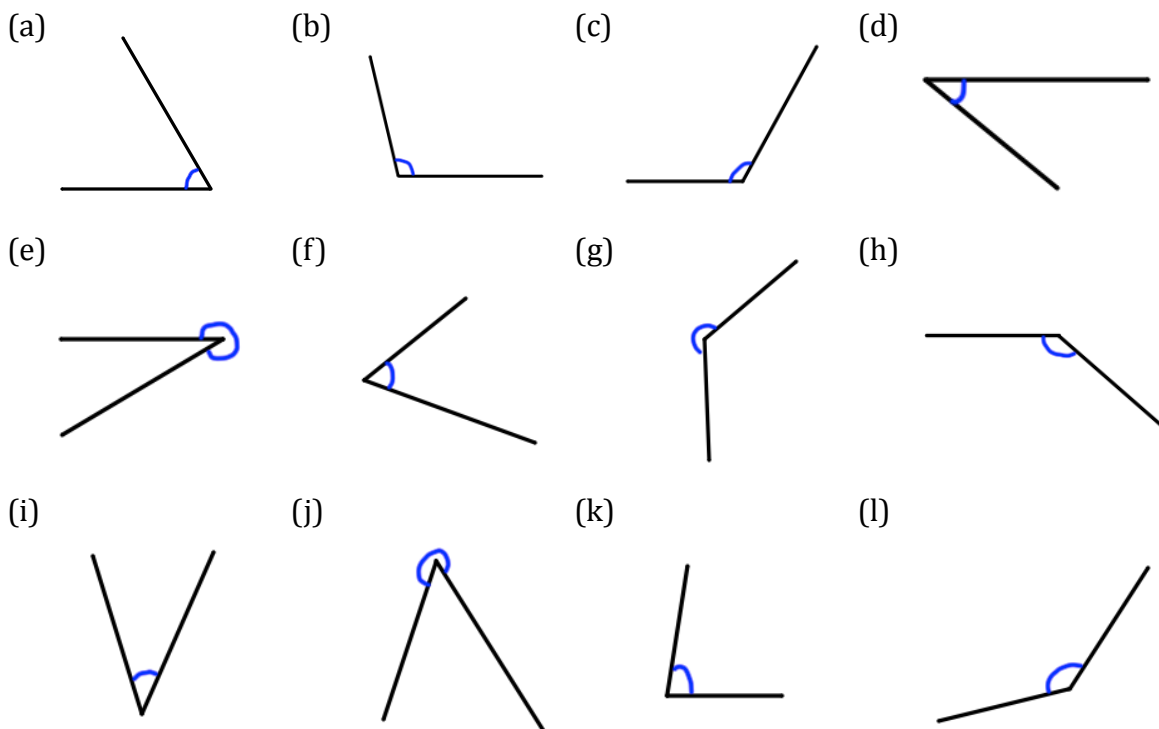


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Question 1: Write down if each angle below is acute, obtuse or reflex.

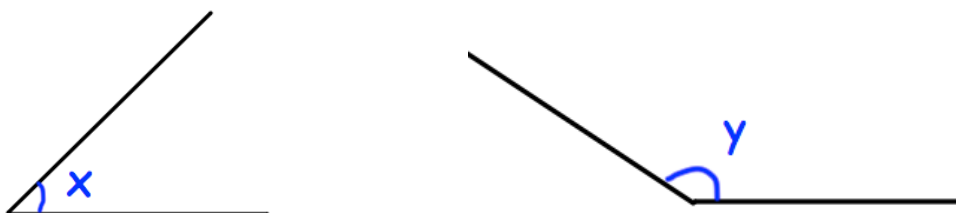


Question 2: Estimate the size of each angle in question 1.

Question 3: (a) Draw any four different acute angles
(b) Draw any four different obtuse angles

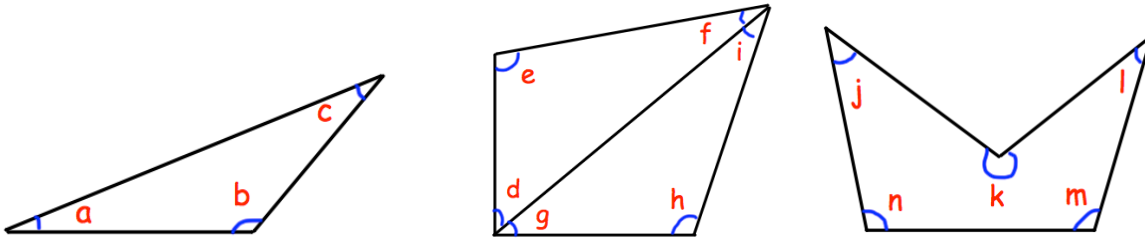
Question 4: Measure the size of each angle you have drawn in question 3.

Question 5: (a) Measure the sizes of angles x and y .



(b) What type of angle is angle x ?
(c) What type of angle is angle y ?

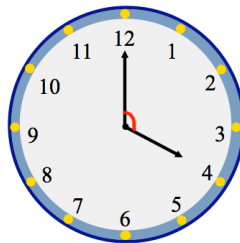
Question 6: For the shapes below, write down the type of each angle labelled.



Question 7: State the type of each angle below

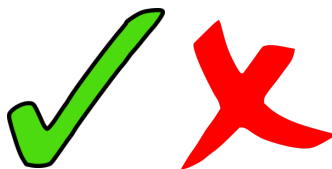
- | | | | |
|----------------|-----------------|-----------------|-----------------|
| (a) 45° | (b) 105° | (c) 200° | (d) 19° |
| (e) 90° | (f) 179° | (g) 318° | (h) 1° |
| (i) 93° | (j) 82° | (k) 89° | (l) 183° |

Question 8: The time on the clock is 4 o'clock.
The angle between the hour hand and minute hand is labelled.



- What type of angle is shown?
- What size is the angle?
- At what time will the angle between the hour hand and minute hand be 60° ?

Answers



Click here



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Angles: Measuring

Video 31 on Corbettmaths

Examples

Workout

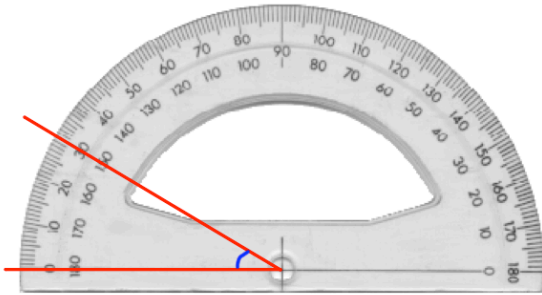


Click here

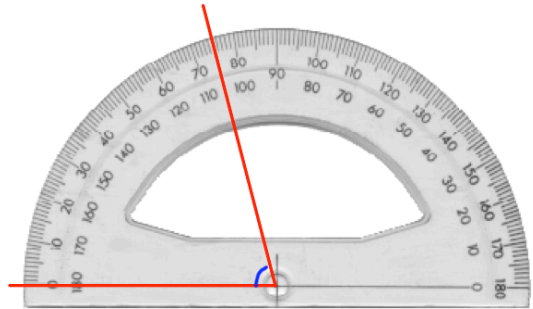


Scan here

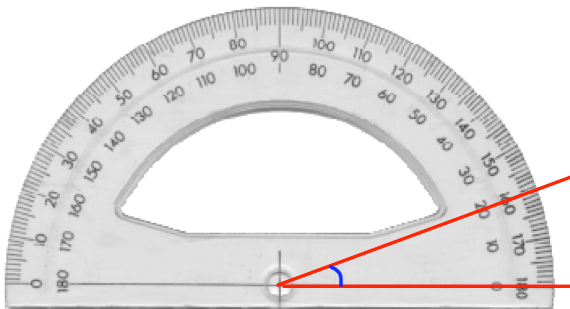
Question 1: Write down the size of each angle being measured (a)



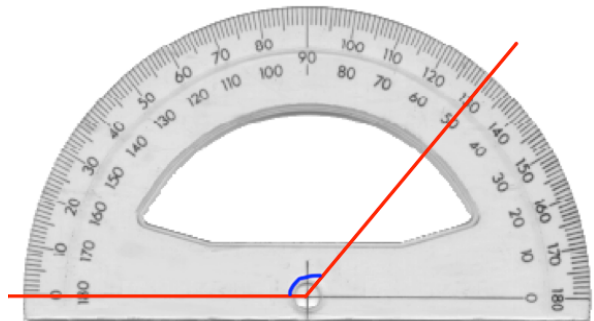
(b)



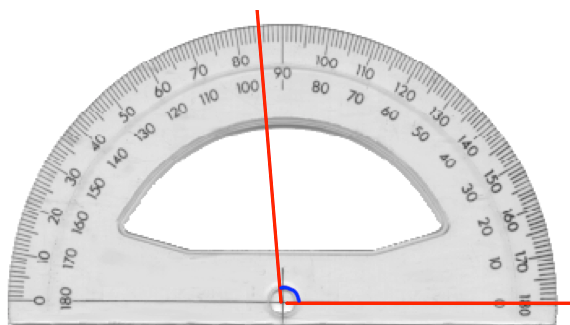
(c)



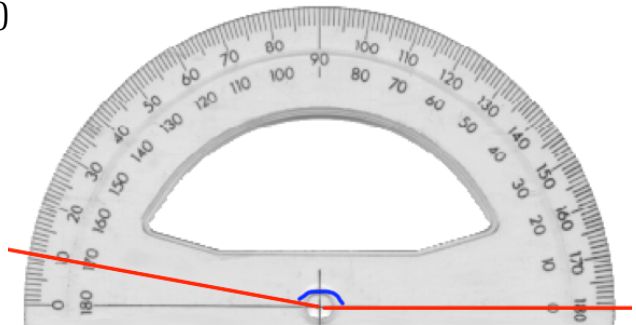
(d)



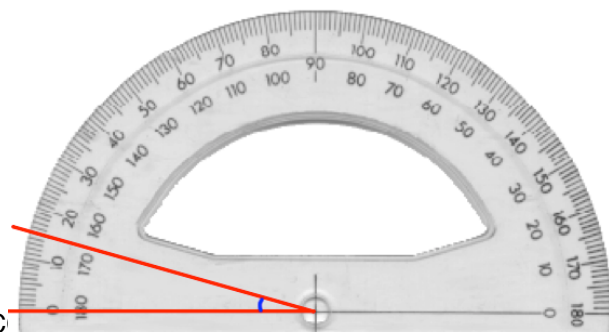
(e)



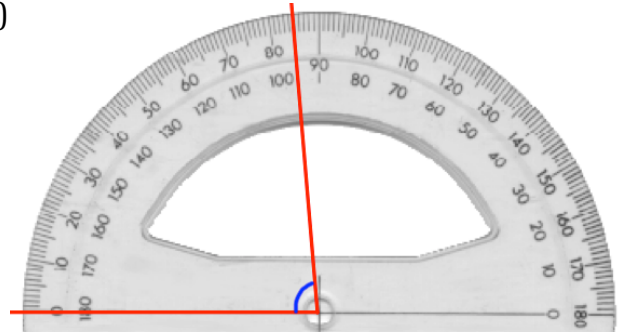
(f)



(g)

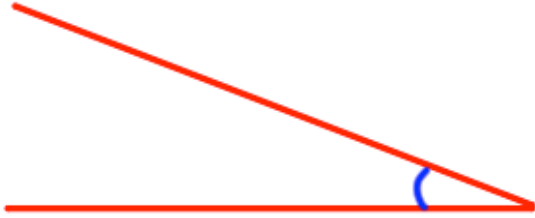


(h)

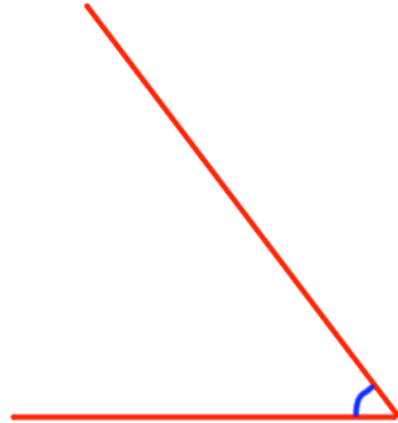


Question 2: Measure each angle below

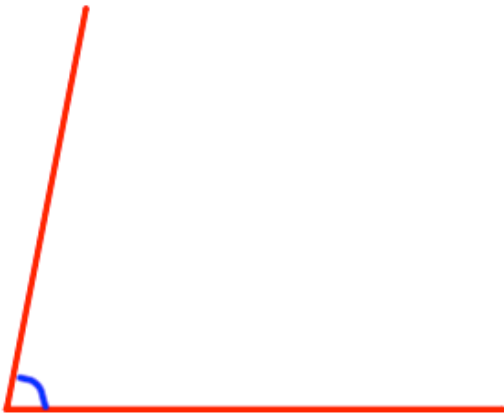
(a)



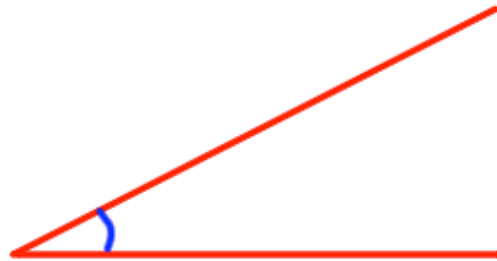
(b)



(c)



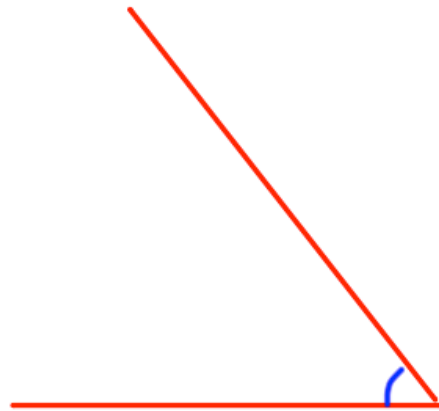
(d)



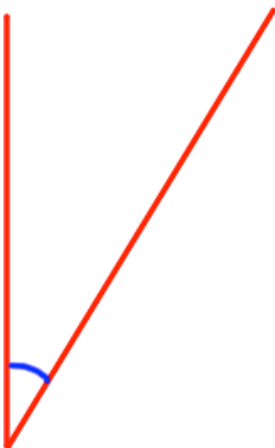
(e)



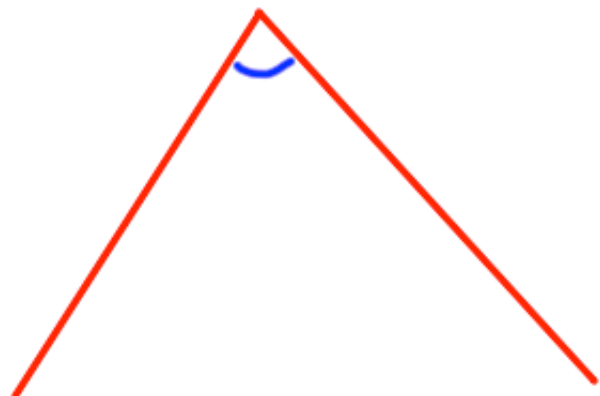
(f)



(g)

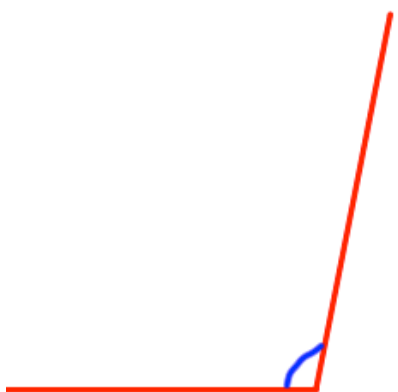


(h)



Question 3: Measure each angle below

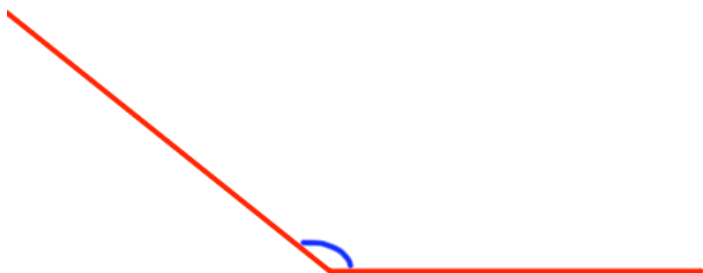
(a)



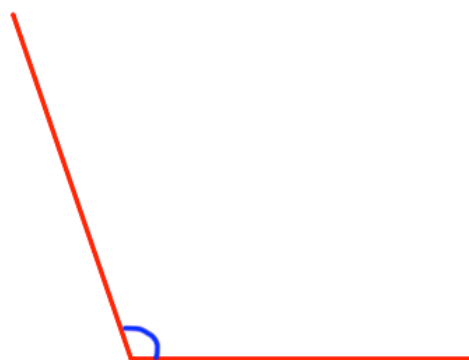
(b)



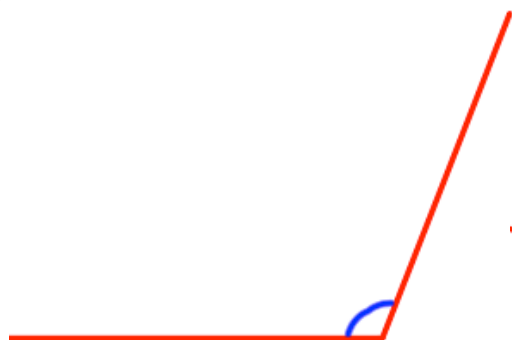
(c)



(d)



(e)



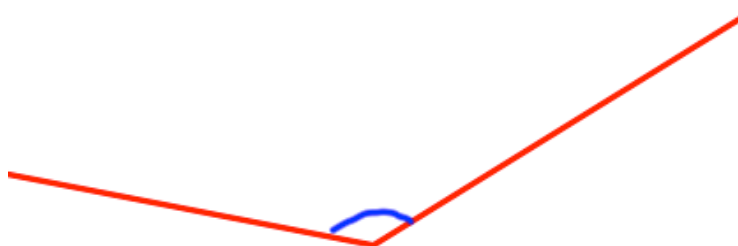
(f)



(g)

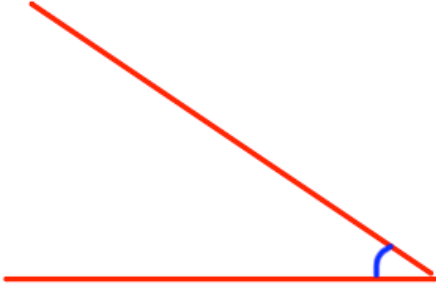


(h)

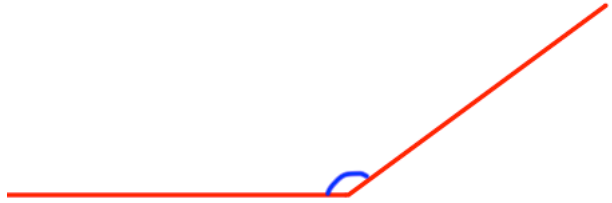


Question 4: Measure each angle below

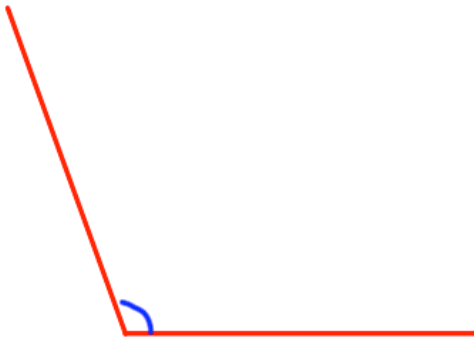
(a)



(b)



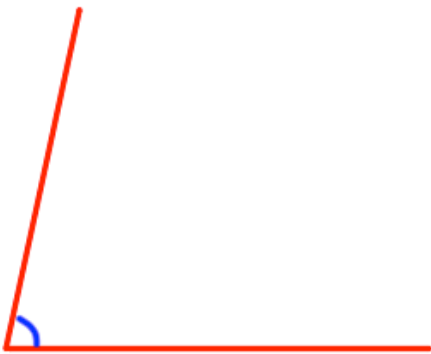
(c)



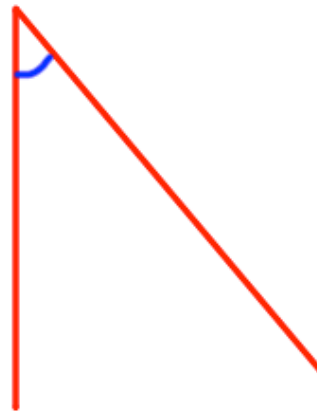
(d)



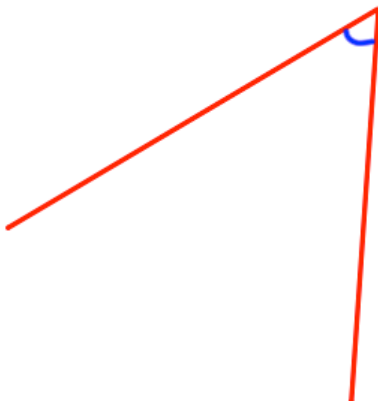
(e)



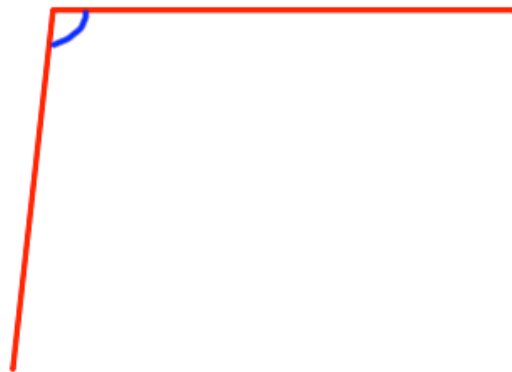
(f)



(g)



(h)



Angles: Measuring

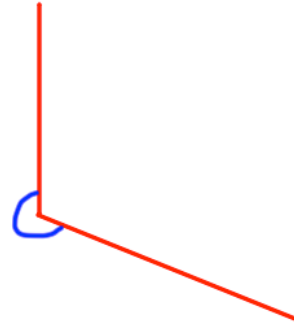
Video 31 on Corbettmaths

Question 5: Measure each reflex angle below

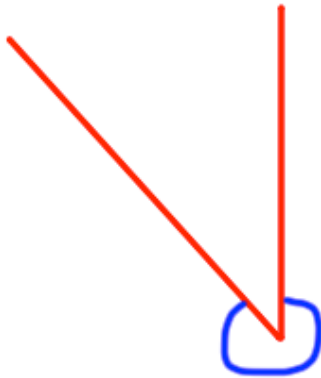
(a)



(b)



(c)

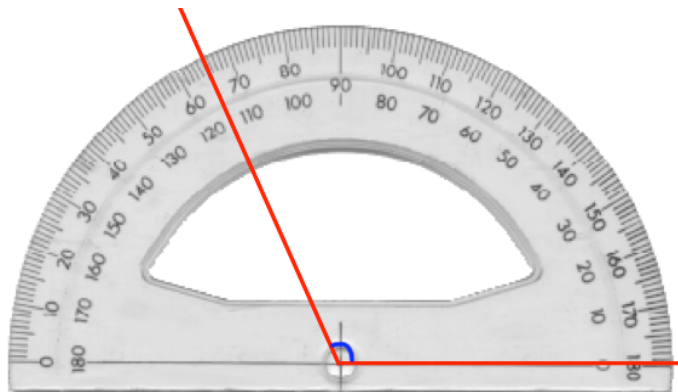


(d)



Apply

Question 1: Sophie has been asked to measure this angle. Her answer is 65° . She has made a mistake. Explain what she has done wrong.



Answers



Angles: Drawing

Video 28 on Corbettmaths

Examples



Click here



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Workout

Question 1: Draw angles of the following size

- | | | | |
|----------------|----------------|----------------|----------------|
| (a) 20° | (b) 60° | (c) 80° | (d) 40° |
| (e) 10° | (f) 70° | (g) 50° | (h) 45° |
| (i) 25° | (j) 85° | (k) 75° | (l) 15° |
| (m) 12° | (n) 62° | (o) 38° | (p) 71° |
| (q) 56° | (r) 23° | (s) 28° | (t) 19° |

Question 2: Draw angles of the following size

- | | | | |
|-----------------|-----------------|-----------------|-----------------|
| (a) 100° | (b) 150° | (c) 160° | (d) 120° |
| (e) 170° | (f) 130° | (g) 110° | (h) 125° |
| (i) 145° | (j) 165° | (k) 105° | (l) 95° |
| (m) 153° | (n) 107° | (o) 98° | (p) 133° |
| (q) 121° | (r) 149° | (s) 167° | (t) 108° |

Question 3: Draw angles of the following size

- | | | | |
|-----------------|-----------------|-----------------|-----------------|
| (a) 200° | (b) 240° | (c) 270° | (d) 300° |
| (e) 320° | (f) 350° | (g) 215° | (h) 255° |
| (i) 345° | (j) 195° | (k) 233° | (l) 268° |
| (m) 307° | (n) 321° | (o) 206° | (p) 199° |

Angles: Drawing

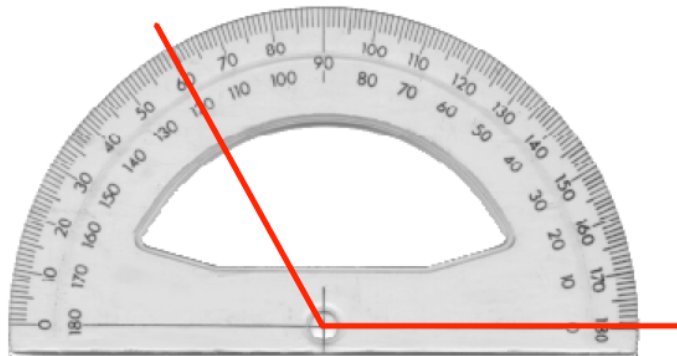
Video 28 on Corbettmaths

Question 4: Draw angles of the following size

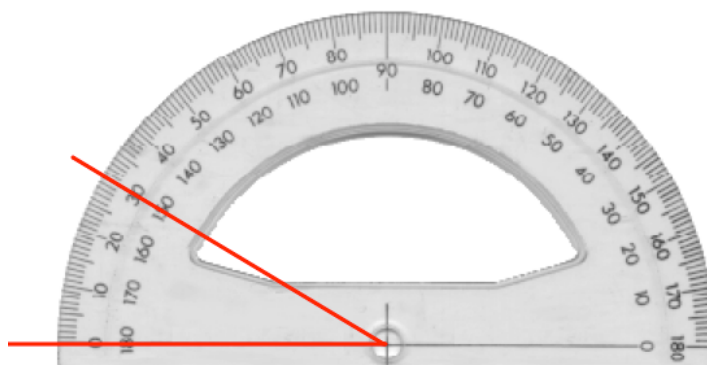
- (a) 30° (b) 225° (c) 175° (d) 98°
(e) 340° (f) 15° (g) 63° (h) 59°

Apply

Question 1: Sophie has been asked to draw a 60° angle.
She has made a mistake. Explain what she has done wrong.



Question 2: Jonathan has been asked to draw a 150° angle.
He has made a mistake. Explain what he has done wrong.



Answers



Click here

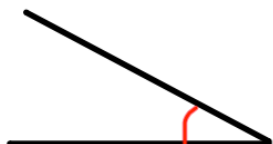


Scan here

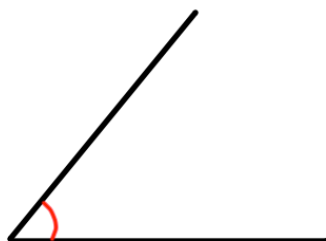
Workout

Question 1: Estimate the size of each of these angles

(a)



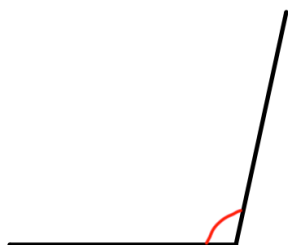
(b)



(c)



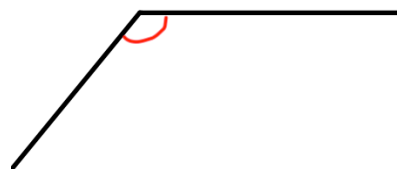
(d)



(e)



(f)



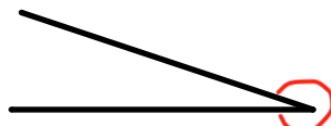
(g)



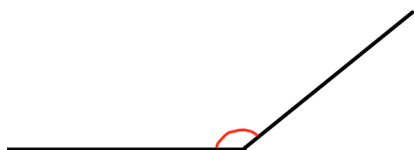
(h)



(i)



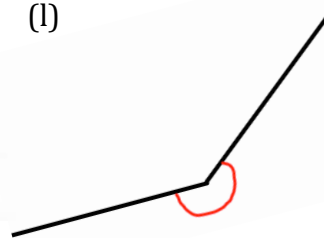
(j)



(k)



(l)



Question 2: Measure the angles accurately and compare your estimation to the actual size of each angle

Task

With a partner, draw 3 angles each.

Both players should estimate the size of each of the six angles.

Measure the actual size of the angles and work out the difference between the estimates.

The person with the lowest total wins.

Angles

Videos 30, 34, 35, 39 on Corbettmaths

Examples



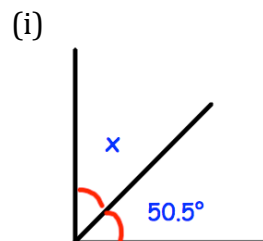
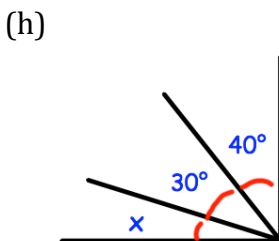
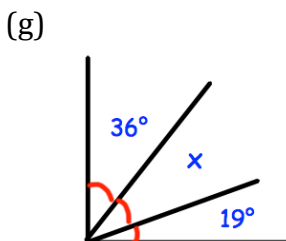
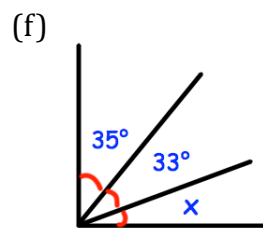
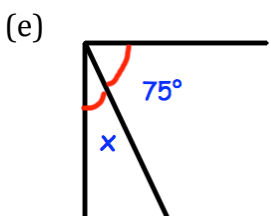
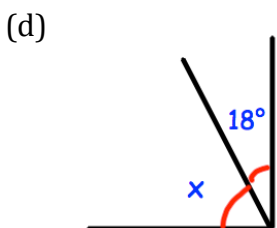
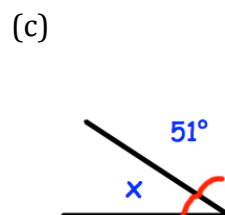
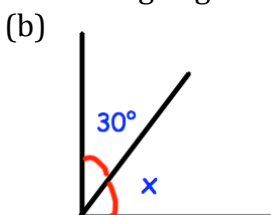
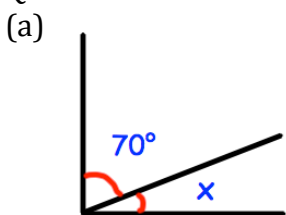
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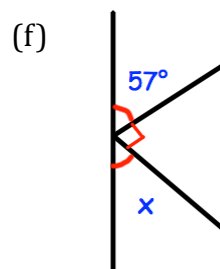
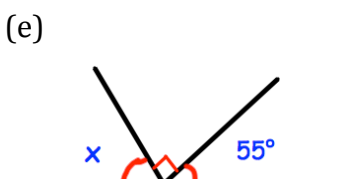
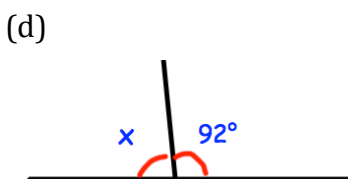
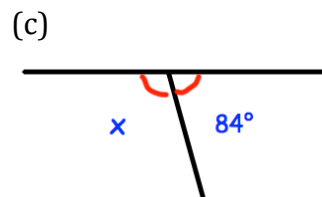
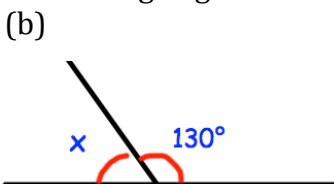
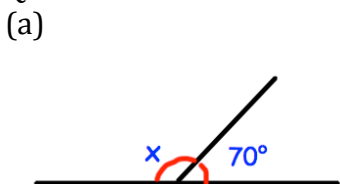
Scan here

Workout

Question 1: Calculate the size of the missing angles



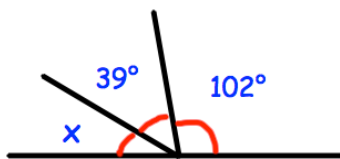
Question 2: Calculate the size of the missing angles



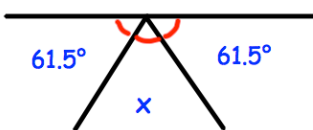
Angles

Videos 30, 34, 35, 39 on Corbettmaths

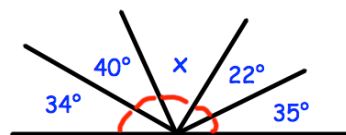
(g)



(h)

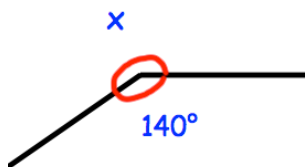


(i)

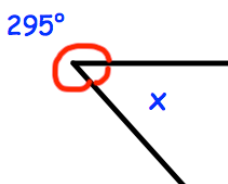


Question 3: Calculate the size of the missing angles

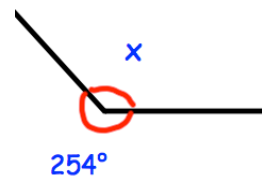
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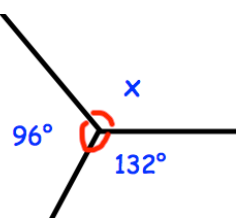
(b)



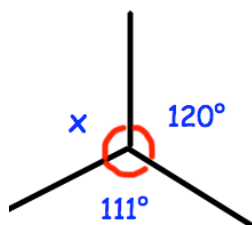
(c)



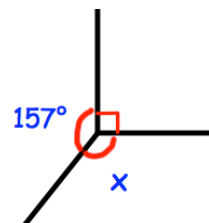
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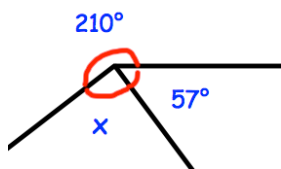
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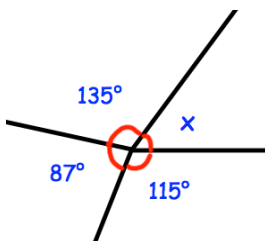
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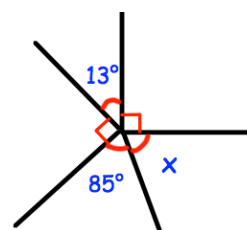
(g)



(h)

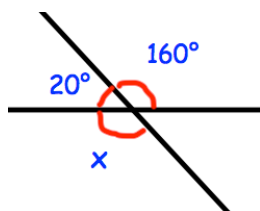


(i)

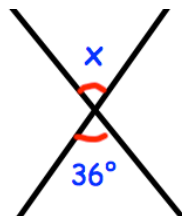


Question 4: Shown below are two straight lines that cross. Calculate the size of the missing angles

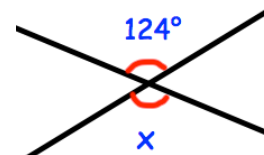
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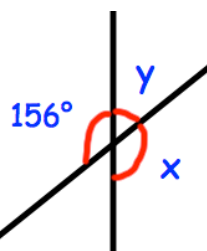
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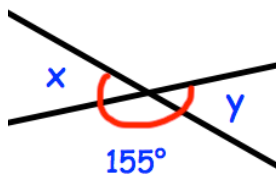
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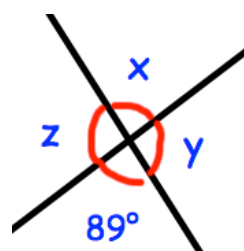
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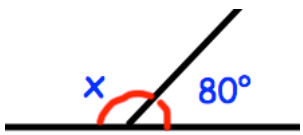
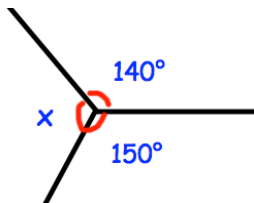
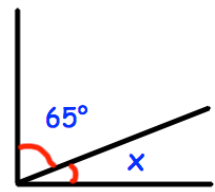
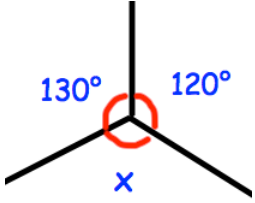
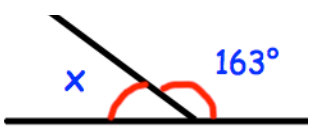
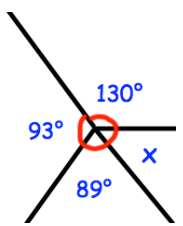
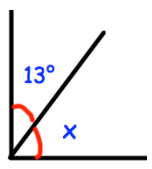
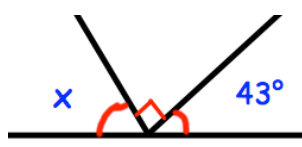
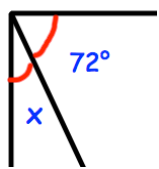
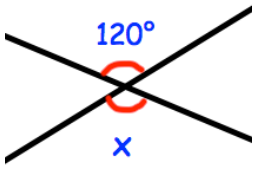
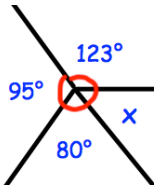
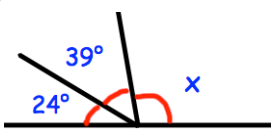
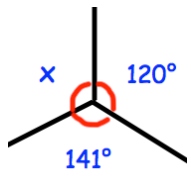
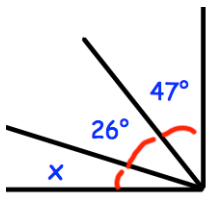
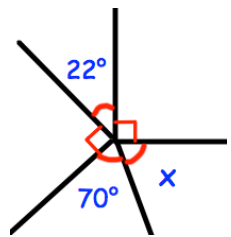
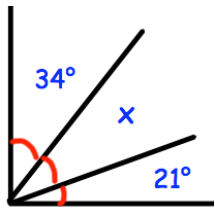
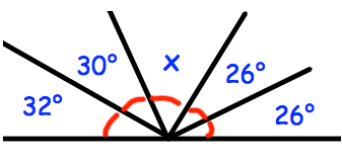
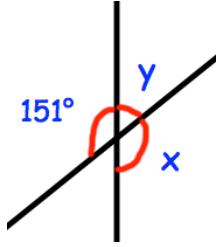
(f)



Angles

Videos 30, 34, 35, 39 on Corbettmaths

Question 5: Calculate the size of the missing angles

<p>(a) </p>	<p>(b) </p>	<p>(c) </p>
<p>(d) </p>	<p>(e) </p>	<p>(f) </p>
<p>(g) </p>	<p>(h) </p>	<p>(i) </p>
<p>(j) </p>	<p>(k) </p>	<p>(l) </p>
<p>(m) </p>	<p>(n) </p>	<p>(o) </p>
<p>(p) </p>	<p>(q) </p>	<p>(r) </p>

Answers



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Angles: Triangles

Video 37 on www.corbettmaths.com

Examples

Workout

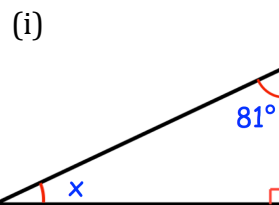
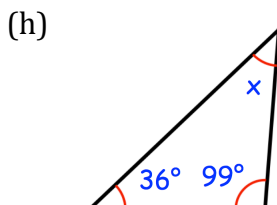
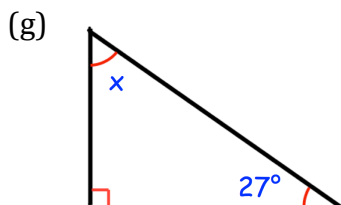
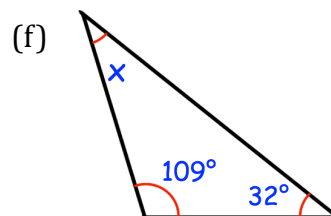
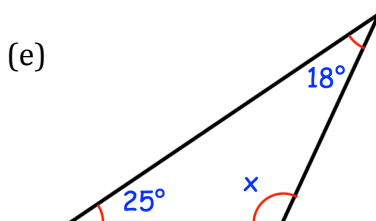
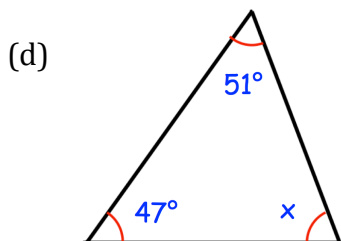
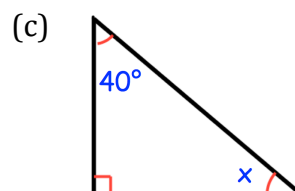
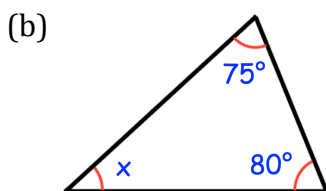
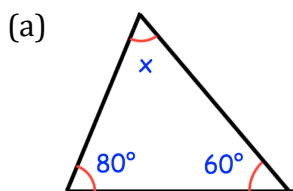


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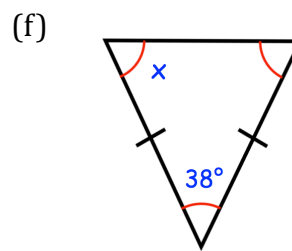
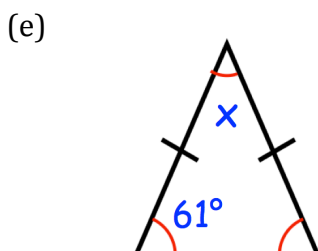
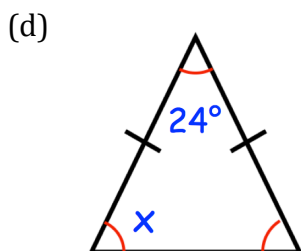
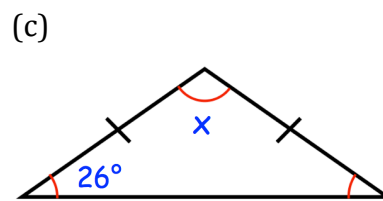
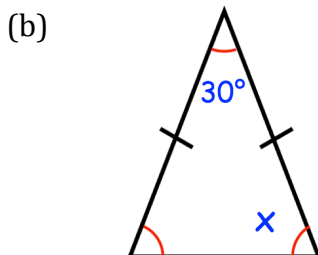
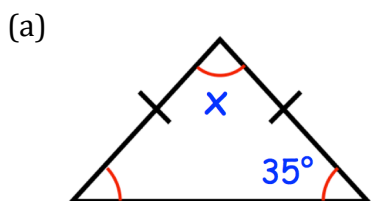


Scan here

Question 1: Find the size of each missing angle.



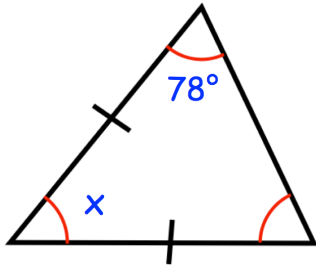
Question 2: Find the size of each missing angle.



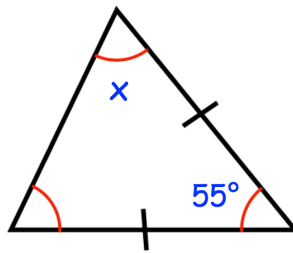
Angles: Triangles

Video 37 on www.corbettmaths.com

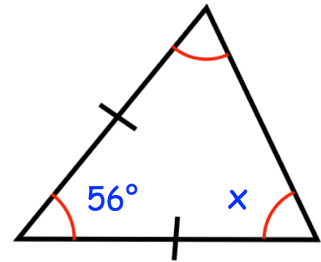
(g)



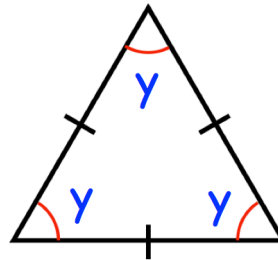
(h)



(i)

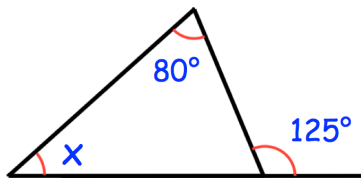


Question 3: Shown is an equilateral triangle.
Find the size y .

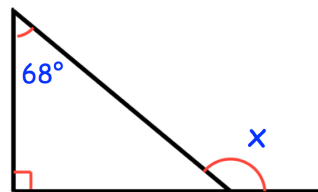


Question 4: Find the size of each missing angle.

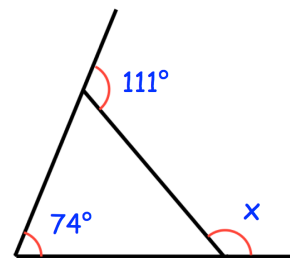
(a)



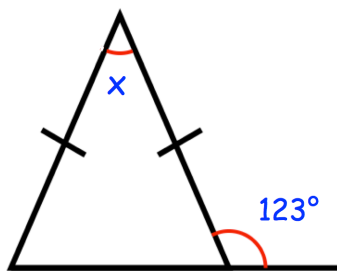
(b)



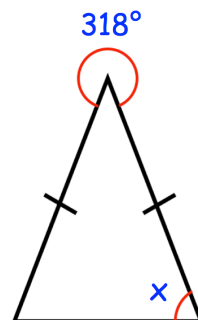
(c)



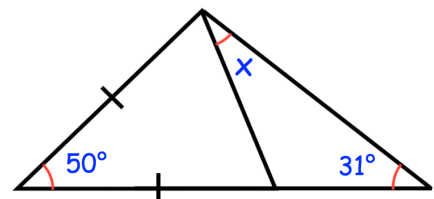
(d)



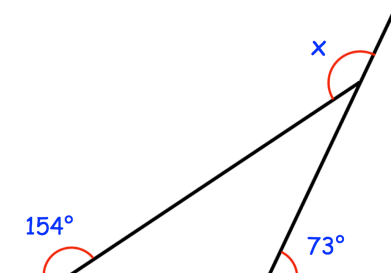
(e)



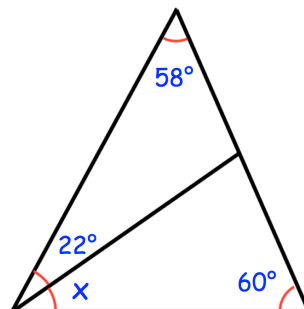
(f)



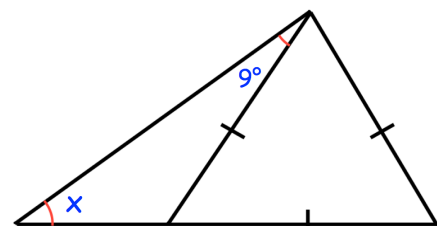
(g)



(h)

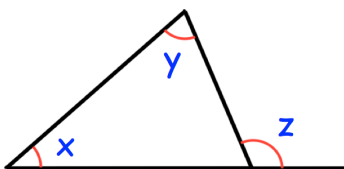


(i)

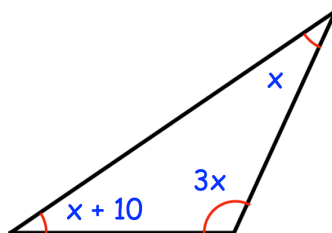


Apply

- Question 1: Jacob has measured the three angles in a triangle.
Two of his measurements are 45° and 70°
What is the third measurement?
- Question 2: James says that a triangle is right angled.
Olivia says that the same triangle is isosceles.
They are both correct.
Explain how.
- Question 3: The ratio of three angles in a triangle are 1:2:3.
Work out the size of each angle.
- Question 4: An isosceles triangle has one angle of 52° .
Write down the possible sizes of the other two angles in the triangle.
Pair 1 and
Pair 2 and
- Question 5: Show the sum of angles x and y is always equal to angle z



- Question 6: The ratio of angles in a triangle is 2:3:5
Find the size of the smallest angle.
- Question 7: Find the size of each angle



Answers



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Angles: Quadrilaterals

Video 33 on www.corbettmaths.com

Examples

Workout

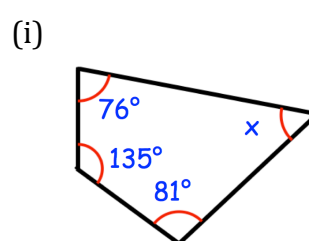
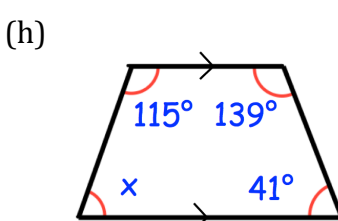
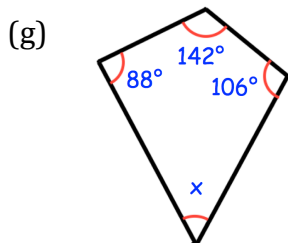
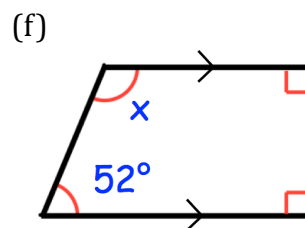
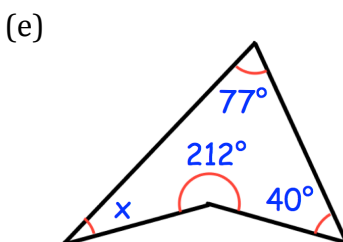
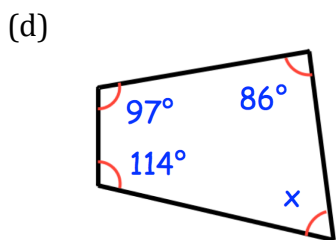
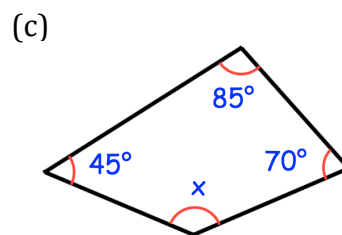
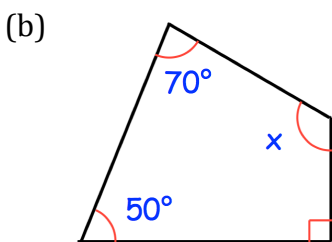
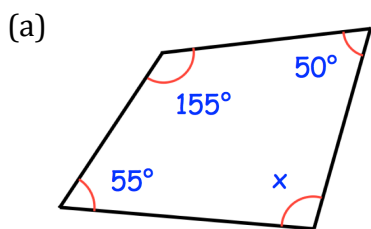


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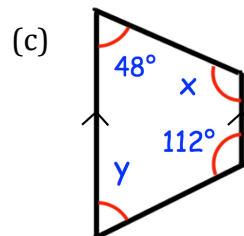
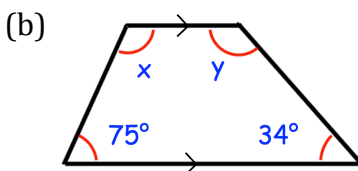
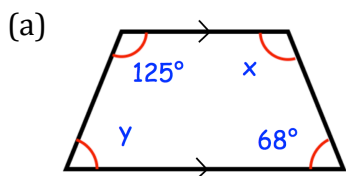


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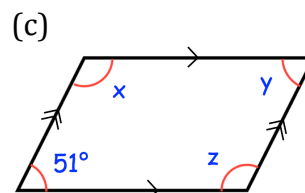
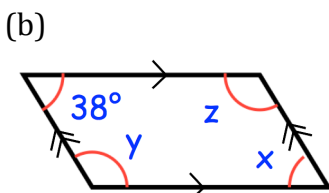
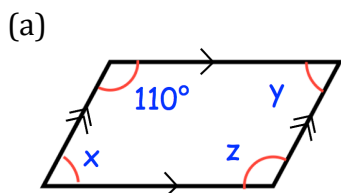
Question 1: Find the size of each missing angle.



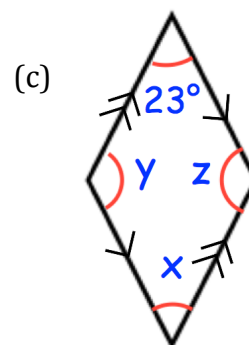
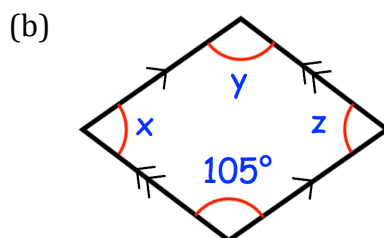
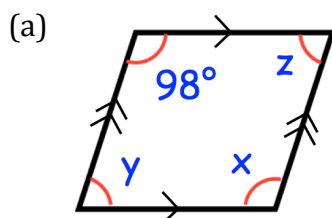
Question 2: Shown below are three trapezia.
Find the size of each missing angle.



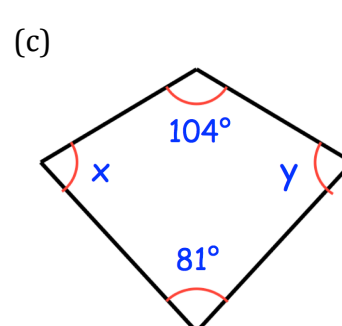
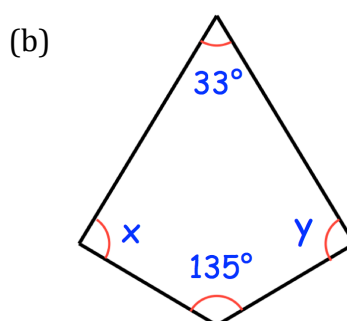
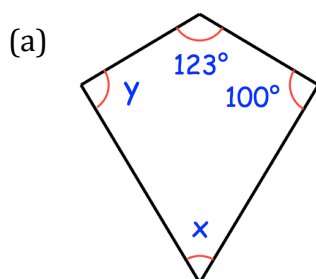
Question 3: Shown below are three parallelograms.
Find the size of each missing angle.



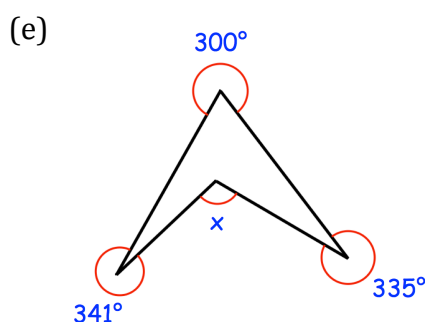
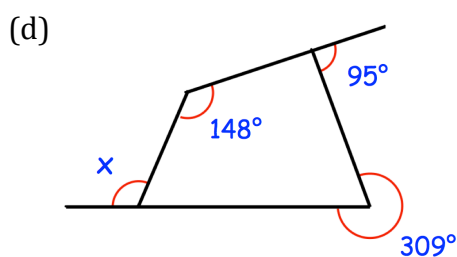
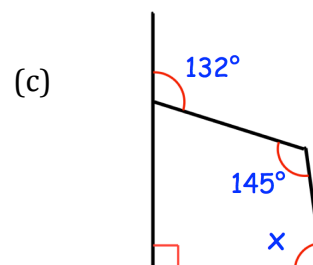
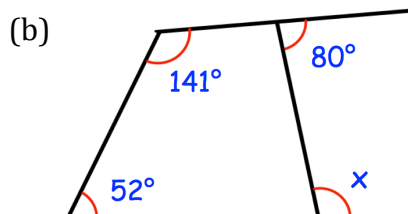
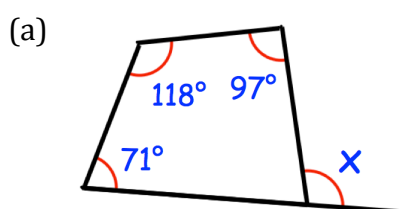
Question 4: Shown below are three rhombuses.
Find the size of each missing angle.



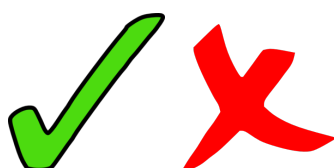
Question 5: Shown below are three kites.
Find the size of each missing angle.



Question 6: Find the size of each missing angle.



Answers



Click here



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Examples



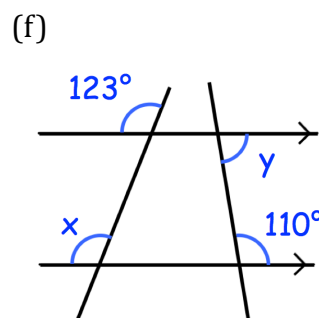
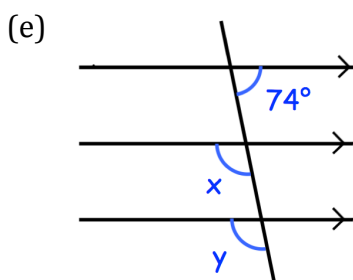
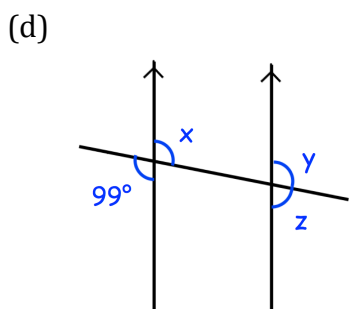
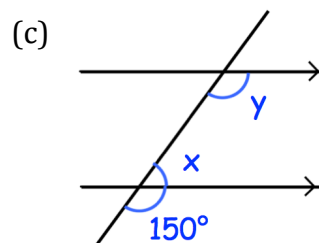
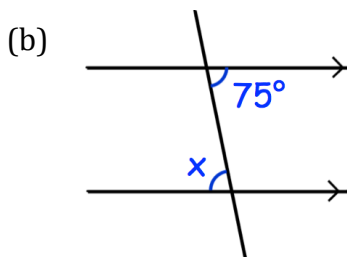
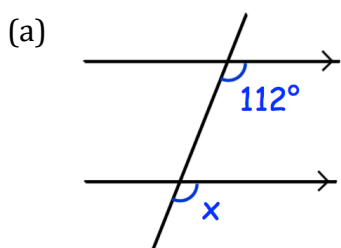
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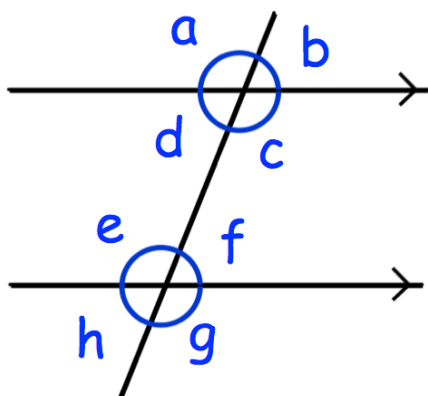
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Workout

Question 1: Write down the sizes of the lettered angles.

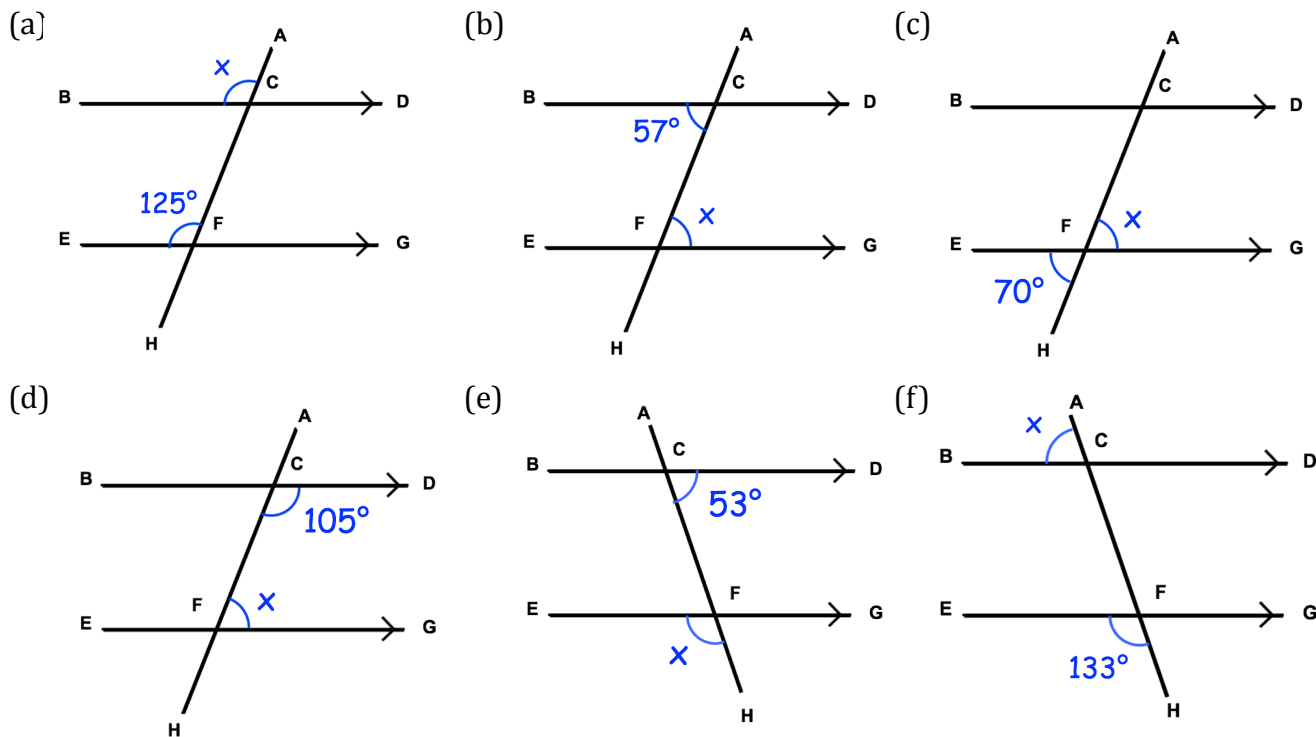


Question 2:

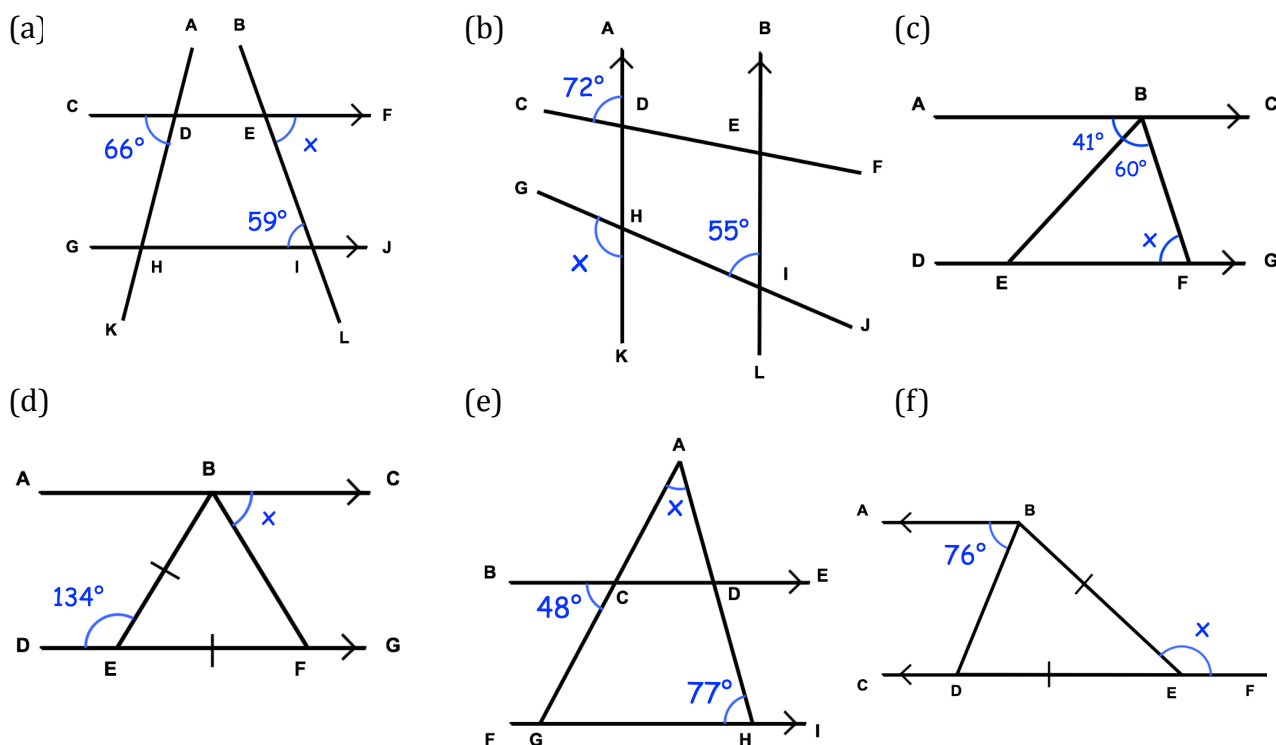


- Which angle is corresponding to angle c?
- Which angle is alternate to angle d?
- Which angle is corresponding to angle h?
- Which angle is vertically opposite to angle a?
- Which angle is alternate to angle e?
- Which angle is co-interior with angle c?
- Which angle is vertically opposite to angle h?
- Which angle is co-interior with angle e?
- Which angle is corresponding to angle a?
- Which angle is vertically opposite to angle g?

Question 3: Find the angle x in each question below.
Give reasons for your answer.

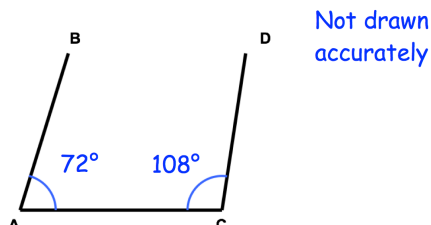


Question 4: Find the angle x in each question below.
Give reasons for your answer.

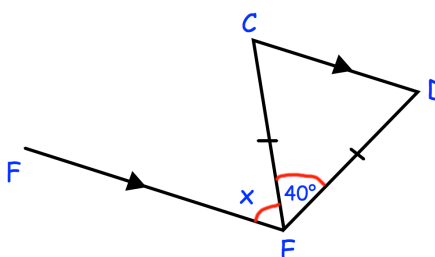


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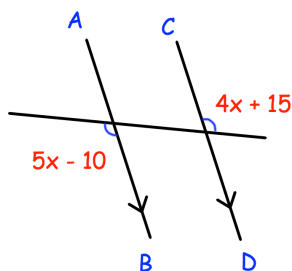
Question 1: Are the lines AB and CD parallel? Explain your answer.



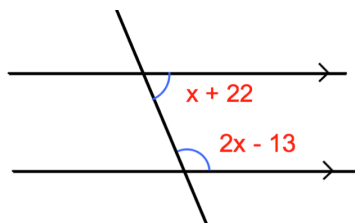
Question 2: Find the missing angle.
Give reasons for your answer.



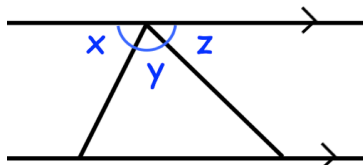
Question 3: Find x



Question 4: Find x



Question 5: Matilda is proving that the angles in a triangle add up to 180° .
She has started with this diagram.
Complete her proof.



Answers



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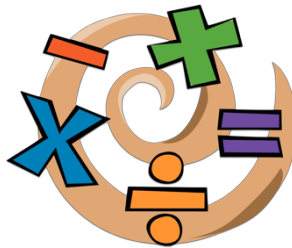


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St Andrew's Academy

Mathematics Department



BLOCK NINE

Number	Algebra	Shape and Angles
<ul style="list-style-type: none">Identifying ratio.Simplifying ratio.Ratio Calculations.Proportional Division.	<ul style="list-style-type: none">Plotting coordinates.Vertical and horizontal lines.Understanding gradient.Table of values.Straight line graphs.	<ul style="list-style-type: none">Understand the probability scale.Simple experimental probability.Calculating probability using fractions and simplifying.

Examples



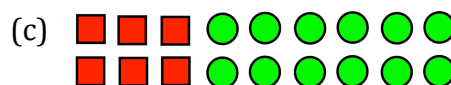
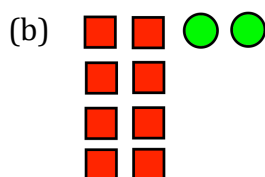
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Workout

Question 1: For each of the following, write down the ratio of red squares to green circles. Give your ratios in their simplest forms.



Question 2: Simplify the following ratios

(a) 4 : 6

(b) 14 : 8

(c) 15 : 10

(d) 6 : 15

(e) 30 : 10

(f) 12 : 16

(g) 6 : 18

(h) 45 : 10

(i) 12 : 28

(j) 24 : 36

(k) 25 : 60

(l) 27 : 63

(m) 48 : 60

(n) 120 : 260

(o) 8000 : 75

(p) 33 : 121

(q) 2.5 : 4.5

(r) 1.5 : 20

(s) 6 : 1.2

(t) 2.25 : 4.95

Question 3: Write the following as ratios in their simplest forms.

(a) £4 to £20

(b) 240cm to 400cm

(c) 50 minutes to 20 minutes

(d) 60kg to 72kg

(e) 12 miles to 30 miles

(f) 15cm to 75cm

(g) 8.5g to 3.5g

(h) £0.50 to £20

(i) 1.02 litres to 0.74 litres

Question 4: Write the following as ratios in their simplest forms.

(a) 8 days to 2 weeks

(b) 1 hour to 15 minutes

(c) 2 hours to 1 day

(d) 95p to £3.00

(e) 400m to 1.5km

(f) 15kg to 900g

(g) 4500ml to 2 litres

(h) 8km to 50mm

(i) 90 minutes to 2 days

Question 5: Express each of the following ratios in the form $1 : n$

- (a) $2 : 3$ (b) $5 : 4$ (c) $4 : 10$ (d) $10 : 7$
(e) $8 : 13$ (f) $5 : 81$ (g) $100 : 131$ (h) $200 : 77$
(i) $25 : 29$ (j) $21 : 40$

Question 6: Express each of the following ratios in the form $n : 1$

- (a) $7 : 2$ (b) $9 : 5$ (c) $11 : 3$ (d) $5 : 8$
(e) $3 : 10$ (f) $19 : 20$ (g) $207 : 50$ (h) $38 : 55$

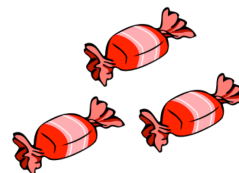
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Question 1: Daisy mixes 50 ml of orange juice with 200 ml of water.
Write down the ratio of orange juice to water.
Give your answer in its simplest form.

Question 2: At a football match, there are 3000 men and 1800 women.
Write down the ratio of male fans to female fans.
Give your answer in its simplest form.



Question 3: Aidan, Bill and Cara share sweets in the ratio of their ages.
Aidan is 12 years old.
Bill is 9 years old.
Cara is 3 years old.
Write down the ratio of their ages.
Give your answer in its simplest form.



Question 4: In a nursery, there are 5 adults and 14 children.
Write the ratio of adults to children in the form $1 : n$

Question 5: Ellie is making a cake.
The instructions say that the ratio of sugar to flour should be $1 : 3$
Ellie uses 250g of sugar and 650g of flour.
Has Ellie used the correct ratio of sugar to flour?



- Question 6: Shannon is revising for her summer exams.
The table below shows the number of minutes Shannon spends revising on each of 5 evenings.
It also shows the number of minutes Shannon spends relaxing on the 5 evenings.

	Monday	Tuesday	Wednesday	Thursday	Friday
Number of minutes revising	88	198	150	133	160
Number of minutes relaxing	20	40	28	25	34

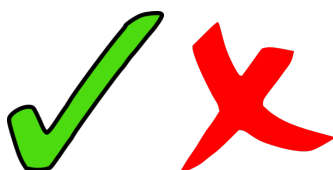
Shannon wants to spend at least 5 minutes revising for every 1 minute of relaxing.
On which days did Shannon spend enough time revising?

- Question 7: Four teachers are planning school trips.
The table shows the number of students and the number of teachers planned to go on the trip.

	Karting	Museum	Theme Park	University
Number of students	140	221	342	159
Number of teachers	8	12	19	9

For every 18 students there must be at least 1 teacher.
Which trips have planned to bring enough teachers?

Answers



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Examples

Workout



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Question 1:

- | | |
|---------------------------------|---|
| (a) Share £20 in the ratio 2:3 | (b) Share 15cm in the ratio 1:2 |
| (c) Divide £24 in the ratio 1:3 | (d) Share 35 sweets in the ratio 4:3 |
| (e) Divide 55g in the ratio 3:2 | (f) Divide 54kg in the ratio 1:5 |
| (g) Share £210 in the ratio 2:5 | (h) Share 120 hours in the ratio 5:7 |
| (i) Share 350m in the ratio 3:7 | (j) Divide 360° in the ratio 1:4 |

Question 2:

- | | |
|-----------------------------------|---------------------------------------|
| (a) Share £104 in the ratio 3:5 | (b) Divide 161 miles in the ratio 6:1 |
| (c) Divide 315ml in the ratio 2:7 | (d) Share \$650 in the ratio 4:9 |
| (e) Share £800 in the ratio 11:14 | (f) Share 1200kg in the ratio 3:37 |
| (g) Divide €510 in the ratio 13:2 | (h) Share 1116mm in the ratio 1:8 |

Question 3:

- | | |
|--------------------------------------|--|
| (a) Share £40 in the ratio 1:3:4 | (b) Divide 63ml in the ratio 2:3:4 |
| (c) Share 88p in the ratio 2:4:5 | (d) Share 180° in the ratio 2:2:5 |
| (e) Divide \$165 in the ratio 1:2:12 | (f) Share 720cm in the ratio 3:4:2:9 |

Question 4:

- | | |
|-----------------------------------|--------------------------------------|
| (a) Share 1km in the ratio 2:3 | (b) Divide 2m in the ratio 9:1 |
| (c) Divide 1 day in the ratio 1:2 | (d) Share 4 minutes in the ratio 2:3 |
| (e) Share £6 in the ratio 1:4 | (f) Share €12 in the ratio 7:17 |

Question 5: Work out each of the following. You may use a calculator

- (a) Share 10ml in the ratio 1:3 (b) Divide 17g in the ratio 2:3
(c) Divide 345ml in the ratio 3:5 (d) Divide £260 in the ratio 5:11
(e) Share 58° in the ratio 2:7 (f) Share 880 seconds in the ratio 2:5:11

Apply

Question 1: Ed has 30 sweets.
The ratio of red sweets to yellow sweets is 2:3
How many red sweets does Ed have?



Question 2: Liam and Nathan share £60 in the ratio 1:3
How much money does each man receive?

Question 3: The ratio of adults to children at a cricket match is 7:3.
There 150 people at the match.
How many children attended the cricket match?



Question 4: Mark is making concrete.
Concrete is made by mixing cement, sand and gravel in the ratio 1:2:3.
Mark wants to make 300kg of concrete.

- (a) How much cement does Mark need?
(b) How much sand does Mark need?
(c) How much gravel does Mark need?

Question 5: The angles in a triangle are in the ratio 1:1:4

- (a) Find the size of each angle
(b) What type of triangle is it?

Question 6: Dorothy has green and blue beads in the ratio 1:4
Dorothy has 80 beads.

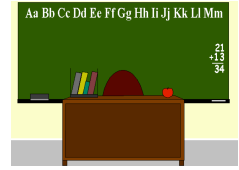
- (a) How many blue beads does she have?
(b) What fraction of the beads are green?
(c) What percentage of the beads are blue?

Ratio: Sharing the Total

Video 270 on www.corbettmaths.com

Question 7: The ratio of boys to girls in a class is 2:3
Ben says there are 28 students in the class.

- (a) Explain why Ben must be wrong
(b) Write down a possible number of students in the class



Question 8: At a football match, the ratio of children to adults is 2:7
There are 2700 people in the crowd.
Each adult ticket is £8
Each child ticket costs £3 less than an adult ticket.

Work out the total money made from ticket sales.

Question 9: In a school, all students study one language, French or Spanish.
The ratio of girls to boys in Year 11 is 4:3
 $\frac{3}{4}$ of the boys study French
There are 168 students in Year 11.



How many of the boys study Spanish?

Question 10: In a school election there were four candidates: Tom, Rebecca, Olly and Wendy.
540 students voted in the election.

5% of the votes were for Tom

$\frac{2}{9}$ of the votes were for Rebecca

The ratio of the number of votes for Olly to the number of votes to Wendy was 1:2

How many votes were for Wendy?

Question 11: A drink is made by mixing orange juice and lemonade in the ratio 1:4
Lemonade costs 80p per litre
Orange juice costs £1.20 per litre
Work out the cost of making 3 litres of the drink.

Question 12: Hannah baked some chocolate, strawberry and vanilla cupcakes.
She baked four times as many chocolate as strawberry cupcakes.
She baked three times as many chocolate as vanilla cupcakes.
Altogether Hannah made 152 cupcakes.

How many cupcakes of each flavour did Hannah make?

Ratio: Sharing the Total
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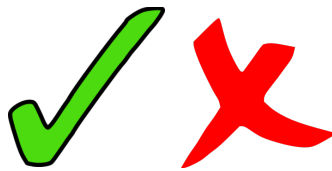
Question 13: In a car park the ratio of white cars to black cars is 2:7
The ratio of white cars to red cars is 3:11
Altogether there are 343 white, black and red cars.

How many black cars are in the car park?

Question 14: At a holiday park, guests either stay in a caravan or in a tent.
In 2017 there were 460 guests.
In 2017 the number of guests was 15% greater than in 2016.
The ratio, in 2016, of people staying in a caravan to staying in a tent was 5:3.

How many guests stayed in caravans in 2016?

Answers



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Examples



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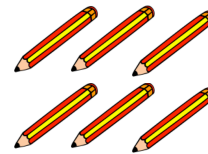
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Workout

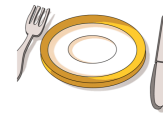
Question 1: Keith buys 6 pencils for 90p



- (a) How much does one pencil cost?
- (b) How much would five pencils cost?
- (c) How much would eleven pencils cost?



Question 2: Jack and Harry are waiters in a restaurant.
They are both paid the same amount of money for each hour that they work.
Jack worked 6 hours and is paid £48
Harry worked 8 hours.
How much money is Harry paid?



Question 3: A car travels 120 miles in 3 hours at a steady speed.



- (a) How far does the car travel in 1 hour?
- (b) How far does the car travel in 8 hours?

Question 4: A plumber charges £140 for a 4 hour job.



How much does the plumber charge for a 3 hour job?

Question 5: Seven candles cost £45.29



How much would 25 candles cost?

Question 6: £50 is worth €56



- (a) How many euros is £1 worth?
- (b) How many euros is £220 worth?


Question 7: If 24 marbles have a mass of 60g, what would the mass of 60 marbles be?



Unitary Method

Video 255a on Corbettmaths

Question 8: Rebecca is making Chilli Con Carne.
Here is a list of ingredients to serve 6 people.




Rebecca wants to make enough Chilli Con Carne for 4 people.

How much of each ingredient does Rebecca need?

serves 6

1.2kg mince
420g tomatoes
3 chillies
600g kidney beans

Question 9: Oscar is making fish pie.
Here is a list of ingredients for 5 people.



Oscar wants to make enough fish pie for 6 people.


How much of each ingredient should Oscar use?

serves 5


500g cod
400g haddock
600ml milk
120g butter
40g flour
1kg potatoes

Apply

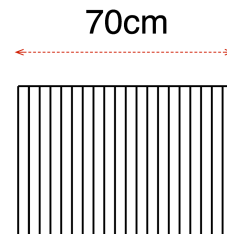
Question 1: On a map, 4cm represents 60 miles.
The distance between two towns is 37.5 miles.
On the map, what is the distance between the two towns?




Question 2: Nathan has 20 identical books on a shelf.
The books take up 70cm of space on the shelf.
Nathan removes seven books.



How much space do the remaining books take up?




Question 3: A car uses 8.4 litres of petrol for a 112 mile journey.
When the tank is full, the car holds 54 litres of petrol.



How far should the car be able to travel on a full tank of petrol?

Question 4: A 345ml tin of paint costs £4.80
A 250ml tin of paint costs £3.35
Which tin is better value for money?



Answers



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Probability Scale
Video 251 on Corbettmaths

Examples



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Workout

Question 1: Which phrase from the box best describes the likelihood of each of these events?
You may use each phrase more than one.

Impossible Unlikely Even Chance Likely Certain

- (a) Rolling a 9 on an ordinary six sided dice.
- (b) A newborn baby being a boy.
- (c) A day picked at random ending with the letter y
- (d) Getting a tail when a coin is flipped.
- (e) It snowing in London in May.
- (f) Rolling a number greater than 1 on an ordinary six sided dice.

Question 2: Which word from the box best describes the likelihood of each of these events?

Impossible Unlikely Even Likely Certain

- (a) You throw a coin and get a Heads.
- (b) You take a green counter from a bag that only contains black counters.
- (c) May 18th 2018 is the day after May 17th 2017.

Question 3: Here are some cards



Impossible Unlikely Even Likely Certain

A card is picked at random.

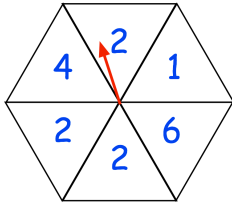
Which word from the box best describes the likelihood of each of these events?

- (a) The card has a blue star on it.
- (b) The card has a heart on it.
- (c) The card has a shape on it that is symmetrical.

Probability Scale

Video 251 on Corbettmaths

Question 4: A fair spinner has six equal sections.



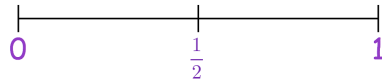
Impossible Unlikely Even Likely Certain

Which word from the box best describes the likelihood of each of these events?

- (a) The arrow landing on an even number
- (b) The arrow landing on 4.
- (c) The number landing on 2.

Question 5: Francesca rolls an ordinary 6-sided dice.

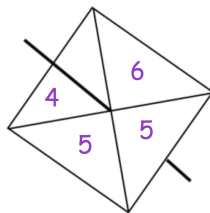
- (a) Mark with a cross the probability that Francesca gets an 8.



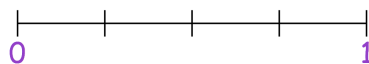
- (b) Mark with a cross the probability that Francesca gets an odd number.



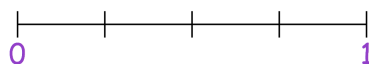
Question 6: A fair 4-sided spinner is spun once.



- (a) On the probability scale, mark with a letter A, the probability that the spinner will land on the number 4.



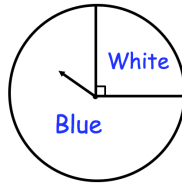
- (b) On the probability scale, mark with a letter B, the probability that the spinner will land on the number 5.



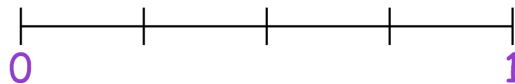
Probability Scale

Video 251 on Corbettmaths

Question 7: The diagram shows a fair spinner.



(a) Which colour is the arrow least likely to land on?



(b) Mark the probability scale with an arrow to show the probability of landing on white.
Label the arrow, W.

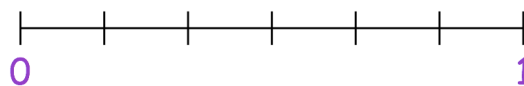
(c) Mark the probability scale with an arrow to show the probability of landing on blue.
Label the arrow, B.

Question 8: A fair six sided dice is rolled once.



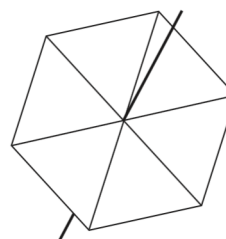
Mark the probability of each of the following events onto the probability scale.

- A: The dice lands on an even number.
- B: The dice lands on the number 5
- C: The dice lands on a number less than 5.



Apply

Question 1: Curtis has a fair 6-sided spinner.
The spinner has numbers less than 7 on it.
The number 5 is the least likely number that the spinner will land on.
There is an even chance that the spinner will land on a 3.
It is impossible that the spinner will land on an even number.
Write the numbers on the spinner.



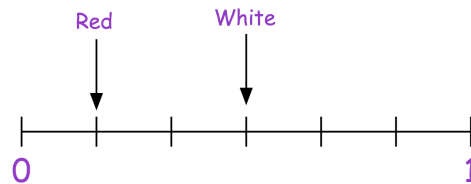
Probability Scale

Video 251 on Corbettmaths

Question 2: Reggie has a bag holding red, white and green counters. Altogether there are 6 counters in the bag.

The probability scale shows the probability that a counter picked at random will be white.

It also shows the probability that a counter picked at random will be white.



Show on the probability scale the probability that a counter picked at random will be green.

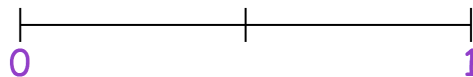
Question 3: A school offers students 3 lunchtime clubs each week: hockey, golf and cricket.

- Which clubs does Helen attend?
- Which of the children attend the cricket club?
- Which of the club do the least of the 5 children attend?
- Which child attends the most clubs?

	Hockey	Golf	Cricket
Helen	✓		✓
Leah			✓
Emily	✓	✓	✓
Mia	✓	✓	
Sally	✓		

Mr White picks one of the 5 children at random

- On the probability scale, mark with a cross the probability that he will pick a child that attends the hockey club.



Answers



Click here



Scan here

Examples

Workout

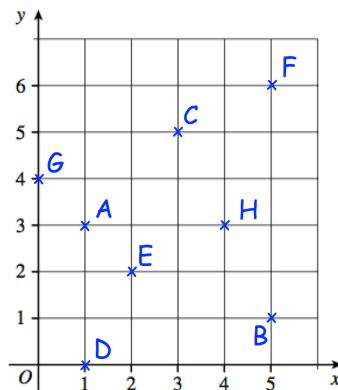


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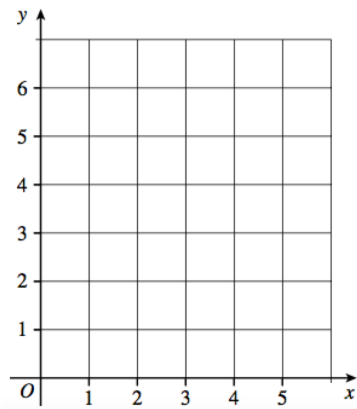
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Question 1: Write down the coordinates of the points A, B, C, D, E, F, G and H.

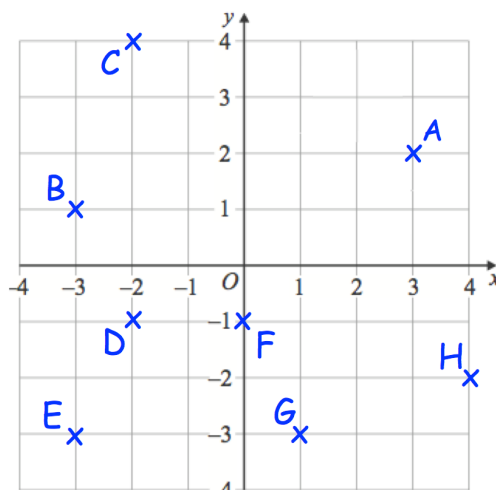


Question 2: Make a copy of the grid shown and then plot the points:

- (a) A (3, 1)
- (b) B (2, 5)
- (c) C (5, 4)
- (d) D (1, 1)
- (e) E (4, 0)
- (f) F (0, 1)
- (g) G (3, 3)
- (h) H (0, 0)

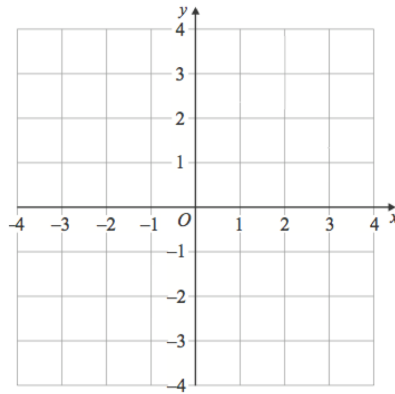


Question 3: Write down the coordinates of the points A, B, C, D, E, F, G and H.



Question 4: Make a copy of the grid shown and then plot the points:

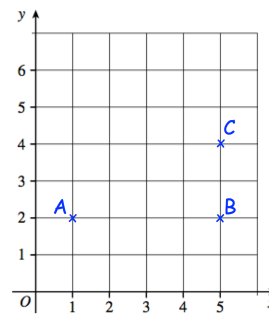
- (a) A (1, 4)
- (b) B (-1, 1)
- (c) C (-3, -4)
- (d) D (2, -1)
- (e) E (-2, 0)
- (f) F (-1, -2)
- (g) G (3, -2)
- (h) H (0, -4)
- (i) I (-2, 2)
- (j) J (-4, -1)
- (k) K (0, 1)



Apply

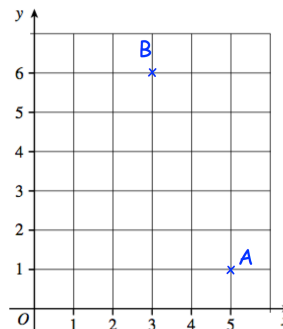
Question 1: Three points are shown on a grid.
ABCD is a rectangle.

- (a) Plot D
- (b) Write down the coordinates of the point D



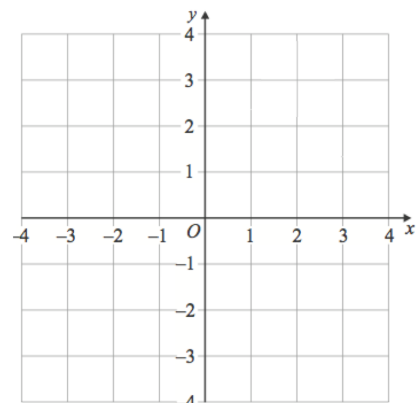
Question 2: Two points are shown on a grid
ABC is an isosceles triangle.

- (a) Plot C
- (b) Write down the coordinates of the point C

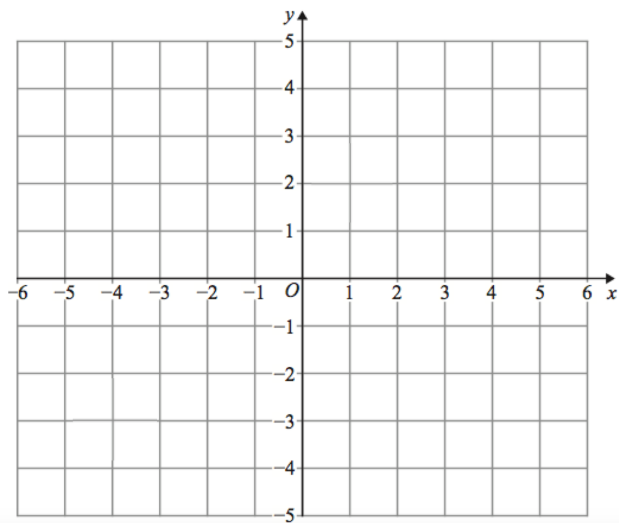


Question 3: Make a copy of the grid shown.

- (a) Plot the point A (-3, -2)
- (b) Plot the point B (1, -2)
- (c) Plot the point C (3, 1)
- (d) Plot the point D (-1, 1)
- (e) What type of quadrilateral is ABCD?



For each question 4-5 below, you will need copies of this grid.



Question 4: (a) Plot the following coordinates

(3, 0) (-3, -2) (1, -4) (1, 2) (-3, 0) (-1, -4) (3, -2) (-1, 2)

(b) Join the shapes to make a polygon.

(c) Name the polygon that you have drawn.

Question 5: (a) Plot the coordinates A (-4, 1), B (1, -2) and C (2, 1)

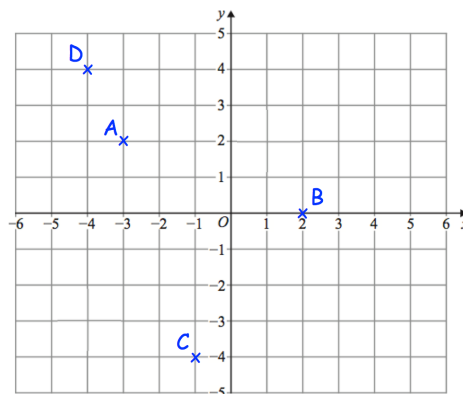
(b) ABCD is a kite.

(c) Plot D

(d) Write down the coordinates of the point D.

Question 6: James has been asked to plot the coordinates A (-3, 2), B (0, 2), C (-1, -4) and D (4, -4)

Can you spot any mistakes?



Answers



Click here



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Listing Outcomes
Video 253 on www.corbettmaths.com

Examples



Workout

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Question 1: Emily flips a coin twice.
One of the possible outcomes is a tail and a tail (TT)
List all the possible outcomes.

Question 2: Benjamin rolls an ordinary six-sided dice once and flips a coin.
List all the possible outcomes.



Question 3: A rugby team plays two matches.
They can win (W), draw (D) or lose (L) each match.
List all the possible outcomes.

Question 4: There are five students in a group: Alison, Beth, Conor, David and Eddie.
Miss Jenkins chooses two students at random from the group to give a presentation.
List all the possible outcomes.

Question 5: Here are four cards.
Each card has a number on it.



- (a) Write down all the 2-digit numbers that can be made using the cards
- (b) Write down all the 3-digit numbers that can be made using the cards

Question 6: Marco visits a restaurant with his friends.
Shown is the menu.
Marco chooses one starter, one main and one dessert.
List all possible outcomes.

Starter	Main	Dessert
Soup	Curry	Ice Cream
Fish	Pizza Burger	Danish

Listing Outcomes

Video 253 on www.corbettmaths.com

Apply

Question 1: Andrew has attempted his maths homework.
Can you spot any mistakes?

Q1 Orla has four types of vegetable.

- Peas
- Carrots
- Turnip
- Spinach

Orla is going to choose 2 different types of vegetable.

Write down all the possible combinations of vegetable she can choose.

PC, PT, PS
CP, CT, CS
TP, TC, TS
SP, SC, ST

Question 2: Here are four cards.
Each card has a number on it.



Write down all the 3-digit even numbers that can be made using the cards

Question 3: In a restaurant, there are 5 possible pizza toppings:
Chicken, Pineapple, Olives, Mushrooms and Beef.

Freddie picks two different toppings on his pizza

(a) List all possible outcomes

Freddie picks the toppings at random

(b) Write down the probability that the pizza contains meat

Question 4: There are two bags.
Bag 1 contains a red counter and a pink counter.
Bag 2 contains a blue counter, a yellow counter and a white counter.

Sam picks a counter at random from bag 1 and notes its colour
He then places this counter into bag 2.
Sam then picks a counter at random from bag 2.

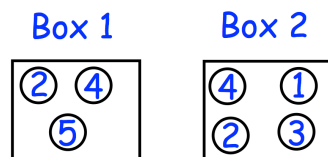


Write down the probability that Sam picks two counters that are the same colour

Listing Outcomes

Video 253 on www.corbettmaths.com

Question 5: Heather has made up a game for a school fête to raise money for charity. There are two boxes of counters. Each counter has a number on it.



The person playing the game will select one counter at random from box 1. They will then select one counter at random from box 2.

(a) Write down all the possible combinations of counters picked.

The person playing the game wins when the numbers multiply to give an odd number.

During the fête the game is played 300 times. The game costs 80p to play. Each prize costs £2

(b) Work out how much money Heather should raise for charity.

Question 6: Ali is having a meal with his friends. He will either have:

- one starter and one main
- or
- one main and one dessert

Starter		Main		Dessert	
Soup	£3.20	Chicken	£6.25	Trifle	£2.50
Prawns	£3.55	Beef	£8.00	Brownie	£2.15
Melon	£2.45	Pork	£6.75	Eton Mess	£3.50
Duck	£3.95			Ice Cream	£1.95

Shown is the menu

Ali has £10. List all the possible combinations that Ali **cannot** afford.

Answers



Click here



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Probability
Videos 244, 245, 250 on Corbettmaths

Examples

Workout



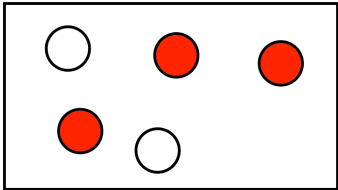
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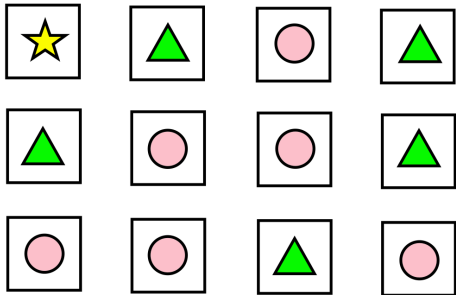
Question 1: Theo has 3 red sweets and 2 white sweets.
He picks a sweet at random.

- (a) Write down the probability that Theo picks a red sweet.
- (b) Write down the probability that Theo picks a white sweet.



Question 2: Leah has 12 cards, each with a shape on it.
She takes a card at random.

- (a) What is the probability that Leah takes a card with a star on it?
- (b) What is the probability that Leah takes a card with a triangle on it?
- (c) What is the probability that Leah takes a card with a circle on it?



Question 3: Ralph has 9 cards, each with a number on it.



He picks a card at random.
Write down the probability that the chosen card is

- (a) the number 8
- (b) an even number
- (c) a number less than 7
- (d) a multiple of 4
- (e) a square number
- (f) a prime number

Question 4: There are 12 red roses, 5 yellow roses and 3 white roses in a vase.
Felix takes a rose, at random, from the vase.

- (a) Write down the probability that he takes a white rose.
- (b) Write down the probability that he takes a red **or** a white rose.
- (c) Write down the probability that Felix takes a rose that is **not** red.

Probability

Videos 244, 245, 250 on Corbettmaths

Question 5: Leon throws a biased coin.
The probability of getting tails is 0.4
Work out the probability of getting heads.



Question 6: Edith plants a daffodil bulb.
The probability that the bulb will grow is 0.8
What is the probability that the bulb will **not** grow?

Question 7: Wycombe Wanderers play a match of football.
The probability that they win the match is 0.28
The probability that they draw the match is 0.55
Work out the probability that they lose the match.

Question 8: Evelyn has 80 pens in a drawer.
15 pens are black and the other pens are blue.

Evelyn picks a pen at random from the drawer.



- (a) What is the probability that Evelyn picks a black pen?
- (b) What is the probability that Evelyn picks a blue pen?

Question 9: There are 20 counters in a bag.

- 2 of the counters are white.
- 1 of the counters is pink.
- 4 of the counters are black.
- The rest of the counters are purple.

Carter takes a counter at random from the bag.

Show that the probability that the counter is white or purple is $\frac{3}{4}$

Question 10: There are only pink, yellow, green and blue counters in a bag.
The table shows the probability that a counter taken at random from the bag will be pink, green or blue.

Colour	Pink	Yellow	Green	Blue
Probability	0.5		0.1	0.2

- (a) Work out the probability that the counter taken is yellow

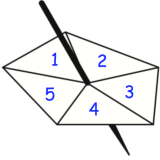
There are 40 counters in the bag.

- (b) Work out the number of blue counters in the bag.

Probability

Videos 244, 245, 250 on Corbettmaths

Question 11: Darcy has a biased spinner.
A spinner has sections labelled 1, 2, 3, 4 and 5.
The table below shows information about some of the probabilities



Number	1	2	3	4	5
Probability	x	0.15	0.05	0.2	0.35

Work out the value of x.

Question 12: Frederick organises a raffle for his school fayre.
The top prize is a ride in a hot air balloon, which will be won by 1 ticket.
Altogether Frederick sells 700 raffle tickets.
Miss Robinson buys 5 tickets for the raffle.



Work out the probability that Miss Robinson does **not** win.

Question 13: There are 20 sweets in a box.
The probability that a chocolate is picked at random from the box is 0.6
How many chocolates are in the box?

Question 14: A bag contains 600 coloured counters.
The counters are yellow, brown or orange.
There are 117 yellow counters in the bag.
The probability that a brown counter is chosen from the bag is 0.35

Calculate the number of orange counters in the bag.

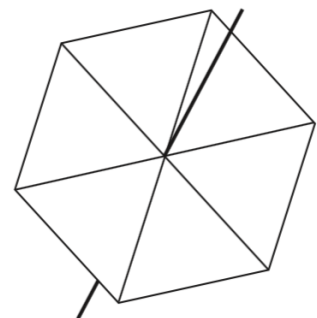
Apply

Question 1: Megan has a fair 6 sided spinner.
The spinner has the letters A, B and C on it.

The probability that the spinner will land on an A is $\frac{1}{2}$

The probability that the spinner will land on a C is $\frac{1}{3}$

Write the letters on the spinner.



Probability

Videos 244, 245, 250 on Corbettmaths

Question 2: Elliott has eight numbered cards.



One of the cards is chosen at random.

Elliott says:

The probability of a 8 is $\frac{1}{4}$

The range of the numbers is 5.

The probability of a number greater than 10 is 0.

The probability of a 7 is $\frac{1}{2}$

Fill in the six missing numbers.

Question 3: The two-way table gives information about 90 people who sat their driving test.

(a) Complete the two-way table

A person is picked at random.

(b) Write down the probability that the person failed their driving test.

(c) Write down the probability that the person had under 20 driving lessons.

	Under 20 driving lessons	20 or over driving lessons	total
Pass		21	30
Fail	45		
total			90

Somebody who passed their driving test is picked at random.

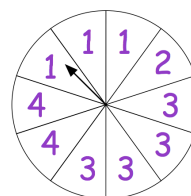
(d) Work out the probability that this person had under 20 driving lessons.

Question 4: Isaac has made two fair spinners.
Spinner 1 has 10 equal sized sections.
Spinner 2 has 4 equal sized sections.

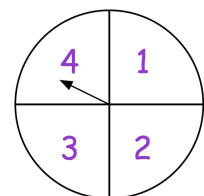
Isaac says

“It is more likely to get a 4 on spinner 1 than spinner 2 because there are two number 4s on spinner 1 and only one number 4 on spinner 2.”

Spinner 1



Spinner 2



Explain why Isaac is incorrect.

Probability

Videos 244, 245, 250 on Corbettmaths

Question 5: The table shows the shoe size of 23 students.

Shoe Size	Frequency
5	2
6	11
7	5
8	4
9	1

A student is picked at random.

- (a) Work out the probability that the student has a shoe size of 8.
- (b) Work out the probability that the student has a shoe size of 7 or smaller.

Question 6: A football team can win, draw or lose a match.
The table shows the probabilities of each result.

Result	Win	Draw	Lose
Probability		0.05	0.3

Each win is worth 3 points.
Each draw is worth 1 point.
Each loss is worth 0 points.
The football team plays 40 games in a season.

Work out how many points the football team should receive in one season.

Question 7: Beatrice has a biased four sided spinner.
The table shows the probabilities that the spinner will land on a 2 or 3.

Number	1	2	3	4
Probability		0.1	0.3	

The probability that the spinner will land on 1 is three times the probability that the spinner will land on 4.

Work out the probability that the spinner will land on 1.

Question 8: Finn has some sweets in a bag.
5 of the sweets are lemon flavoured.
7 of the sweets are strawberry flavoured.
The rest of the sweets are mint flavoured.

The probability that Finn takes a mint flavoured sweet is $\frac{2}{5}$

How many mint flavoured sweets are in the bag?

Question 9: Gracie has more than 5 coins.
The total value of the coins is 50p.

Gracie is going to pick one of the coins at random.

The probability that Gracie picks a **1p** coin is $\frac{1}{5}$

List all the coins that Gracie has.

Question 10: A box contains lego blocks of the same size.
Each block is white, blue, green or red.

Colour	White	Blue	Green	Red
Probability	0.25	0.45		0.2

The table shows the probabilities that a block picked at random is white, blue or red.

(a) Work out the probability of a green block

There are 60 red lego blocks.

(b) How many white lego blocks are there?

Question 11: A bag contains good and bad apples.
 n of the apples are good.
The other 5 apples are bad.

(a) Write down an expression, in terms of n , for the number of apples in the bag altogether.

Maryam will take at random, an apple from the bag.

(b) Write down an expression, in terms of n , for the probability that Maryam will take a good apple.

(c) Write down an expression, in terms of n , for the probability that Maryam will take a bad apple.

Probability

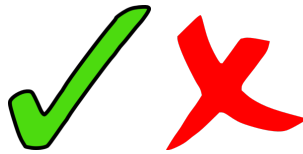
Videos 244, 245, 250 on Corbettmaths

Question 12: There are only red, black and green pens in a box.

There are three times as many red pens as green pens.
There are four as many black pens than red pens.

Work out the probability of a black pen being selected.

Answers



Click here



Scan here

Workout

Question 1: For each equation, complete the table of values and draw its graph for values of x from -1 to 3 .

(a) $y = 2x + 1$

x	-1	0	1	2	3
y	-1	1			7

(b) $y = 3x - 1$

x	-1	0	1	2	3
y	-4			5	

(c) $y = 2x - 3$

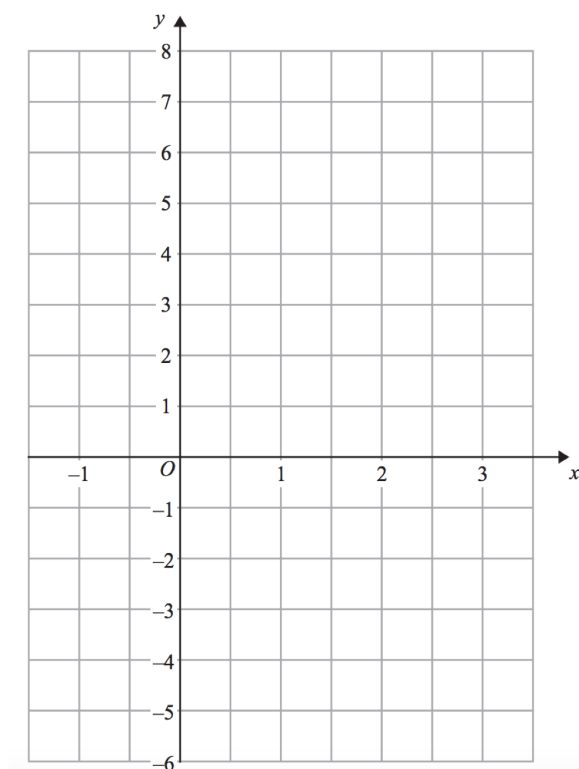
x	-1	0	1	2	3
y		-3	-1		

(d) $y = x + 4$

x	-1	0	1	2	3
y					7

(e) $y = 2x$

x	-1	0	1	2	3
y		0			6



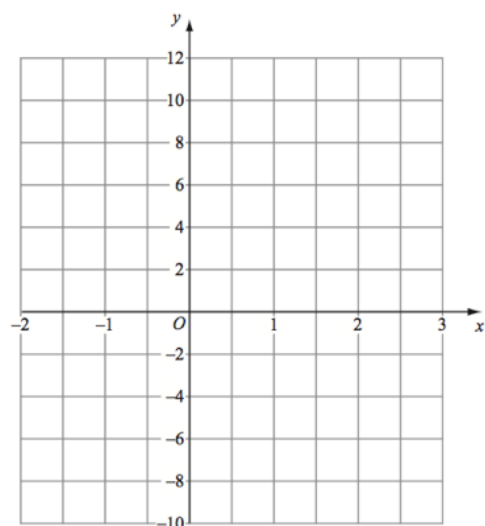
Question 2: For each equation, complete the table of values and draw its graph for values of x from -2 to 3 .

(a) $y = 2x + 4$

x	-2	-1	0	1	2	3
y						

(b) $y = 4x - 2$

x	-2	-1	0	1	2	3
y						



Question 3: For each equation, complete the table of values and draw its graph for values of x from -2 to 2 .

(a) $y = 3x + 3$

x	-2	-1	0	1	2
y					

(b) $y = x + 9$

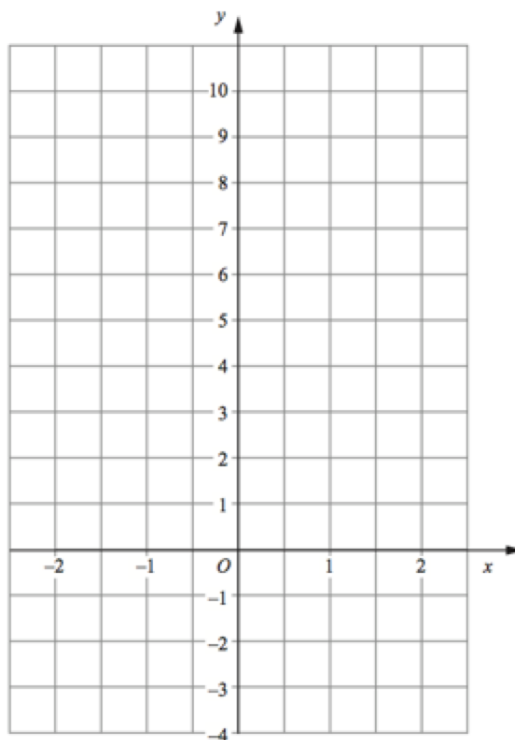
x	-2	-1	0	1	2
y					

(c) $y = x - 2$

x	-2	-1	0	1	2
y					

(d) $y = x$

x	-2	-1	0	1	2
y					



Question 4: For each equation, complete the table of values and draw its graph for values of x from -2 to 4 .

(a) $y = \frac{1}{2}x + 1$

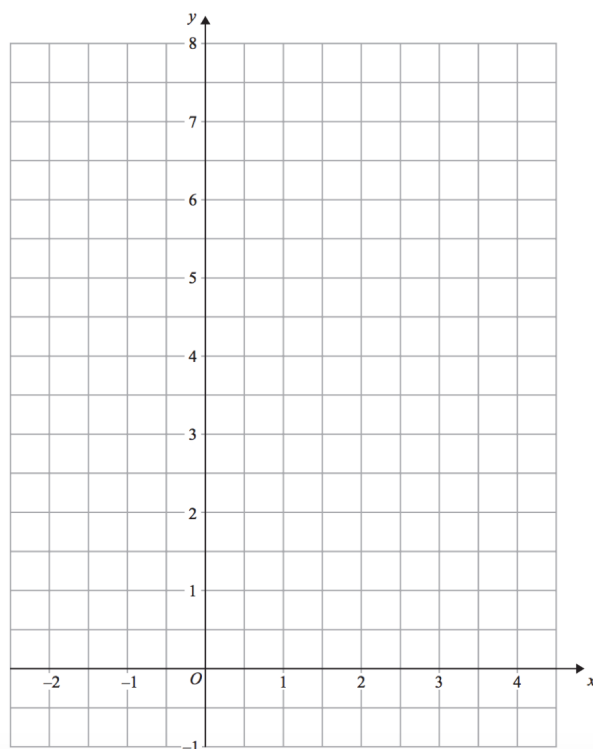
x	-2	-1	0	1	2	3	4
y							

(b) $y = \frac{1}{4}x + 5$

x	-2	-1	0	1	2	3	4
y							

(c) $y = \frac{1}{3}x + 1$

x	-2	-1	0	1	2	3	4
y							



Question 5: For each equation, complete the table of values and draw its graph for values of x from -1 to 3 .

(a) $y = -2x + 5$

x	-1	0	1	2	3
y					

(b) $y = -x - 2$

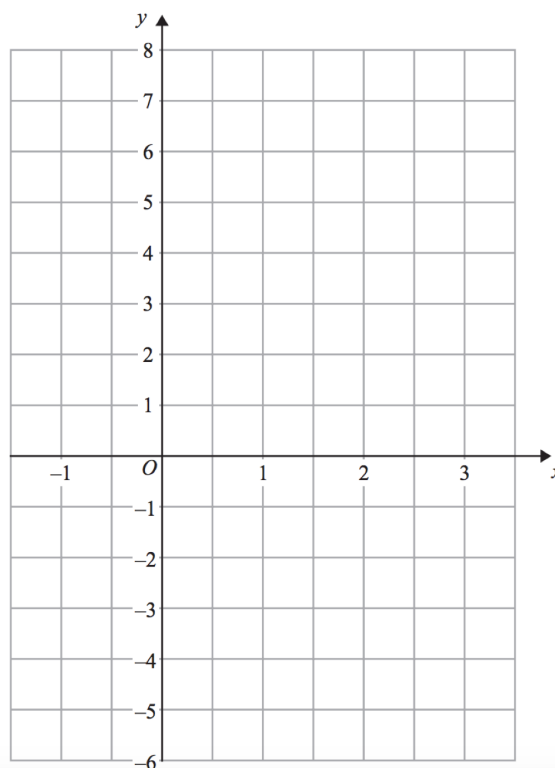
x	-1	0	1	2	3
y					

(c) $y = -2x$

x	-1	0	1	2	3
y					

(d) $y = 6 - x$

x	-1	0	1	2	3
y					



Question 6: For each equation, complete the table of values and draw its graph for values of x from -1 to 3 .

(a) $x + y = 3$

x	-1	0	1	2	3
y					

(b) $2x + y = 4$

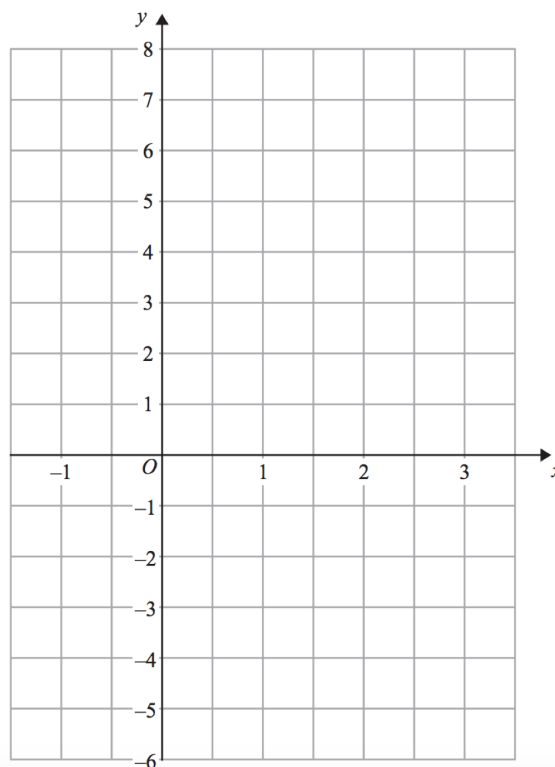
x	-1	0	1	2	3
y					

(c) $x + 2y = -2$

x	-1	0	1	2	3
y					

(d) $2x - y = 4$

x	-1	0	1	2	3
y					



Question 7: For each equation, draw its graph for values of x from -2 to 3 .

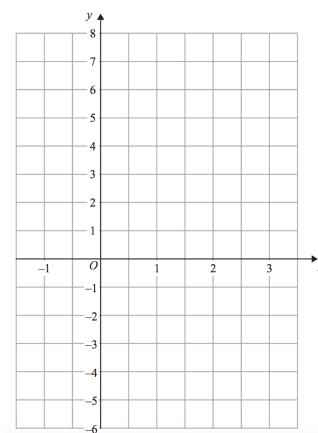
- (a) $y = 2x + 3$
- (b) $y = 5x - 4$
- (c) $y = x - 3$
- (d) $y = 3x$
- (e) $y = \frac{1}{2}x + 3$
- (f) $y = -2x - 1$
- (g) $x + y = 8$
- (h) $2x + y = 12$
- (i) $x + 2y = 10$
- (j) $2x + 3y = 12$
- (k) $2x + 5y - 20 = 0$



Apply

Question 1: (a) Draw $y = x + 1$ and $y = 2x - 1$ on the same set of axes.

(b) Where do the two graphs intersect?



Question 2: (a) Draw $y = 3x - 4$

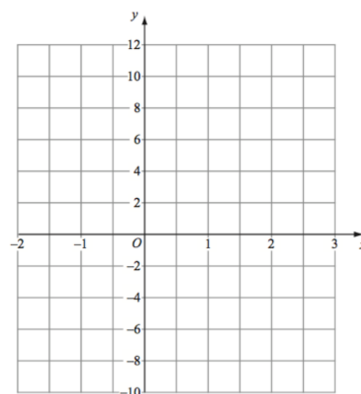
(b) Draw $x + y = 2$

The graph $y = 3x - 4$ crosses the y -axis at the point A
 The graph $x + y = 2$ crosses the x -axis at the point B
 O is the origin.

(c) Write down the coordinates of the point A

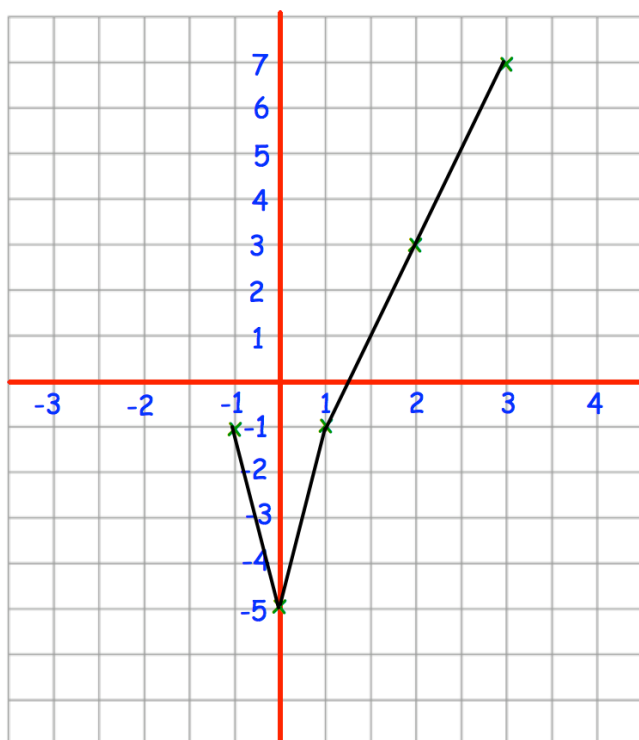
(d) Write down the coordinates of the point B

(e) Find the area of triangle OAB.



Question 3: Emma has tried to draw the graph of $y = 4x - 5$
Can you spot any mistakes?

Question: On the grid, draw $y = 4x - 5$ for values of x from -2 to 2 .

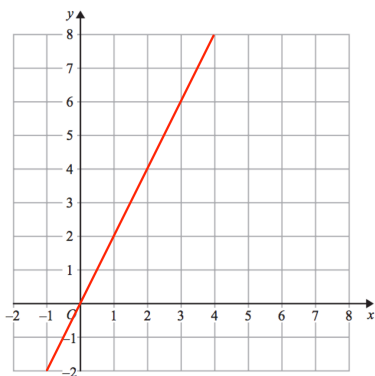


x	-1	0	1	2	3
y	-1	-5	-1	3	7

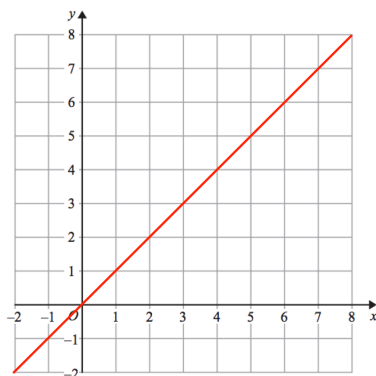
Workout

Question 1: Find the gradient of each of these lines

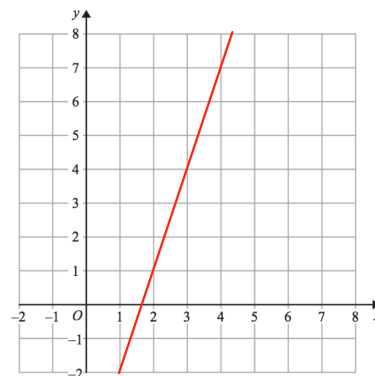
(a)



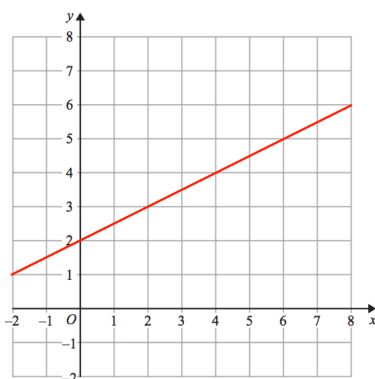
(b)



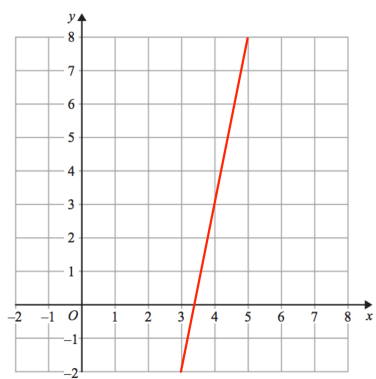
(c)



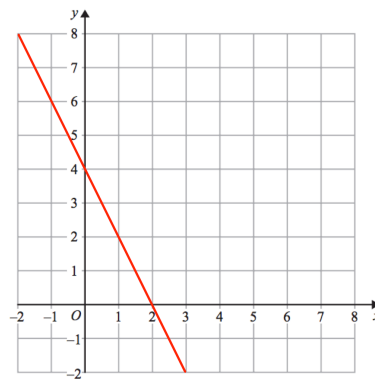
(d)



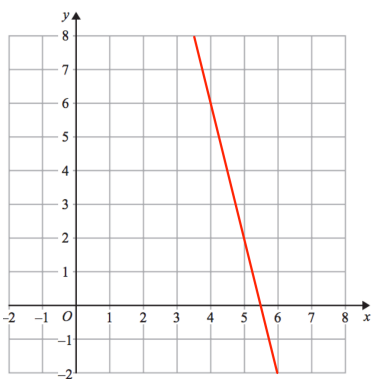
(e)



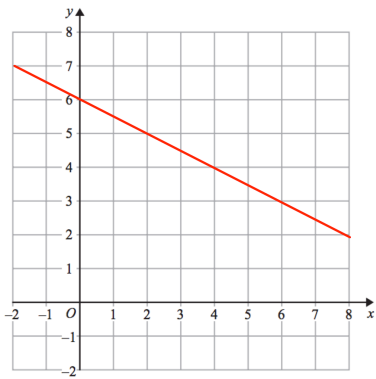
(f)



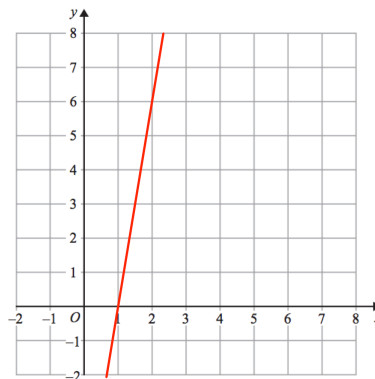
(g)



(h)



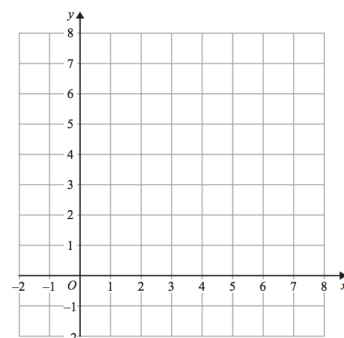
(i)



Question 2: Draw lines with the following gradients

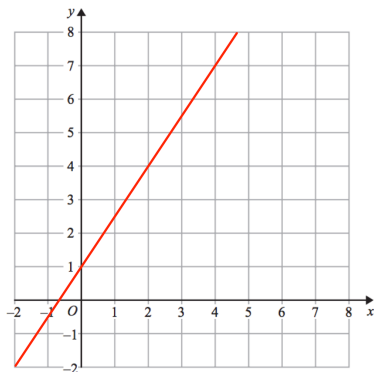
(a) 2 (b) 4 (c) 7 (d) -1

(e) -3 (f) -5 (g) $\frac{1}{2}$ (h) 10

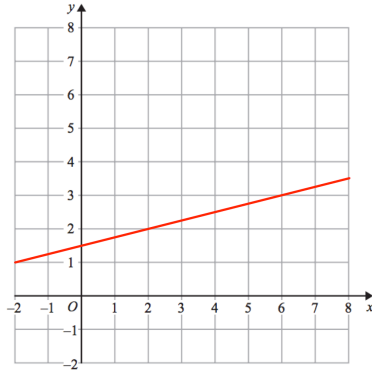


Question 3: Find the gradient of each of these lines

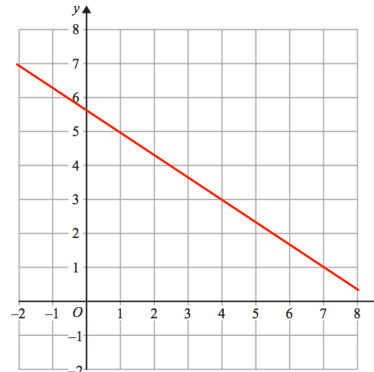
(a)



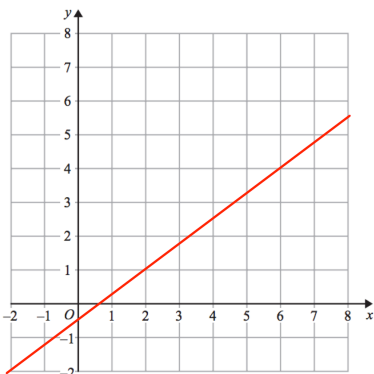
(b)



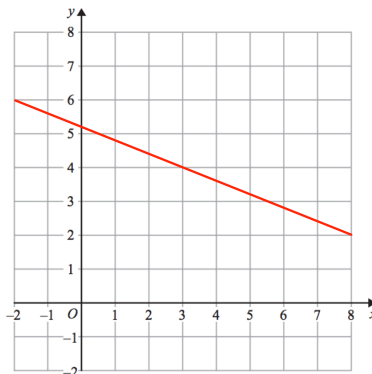
(c)



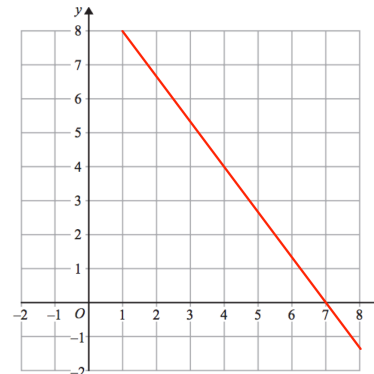
(d)



(e)



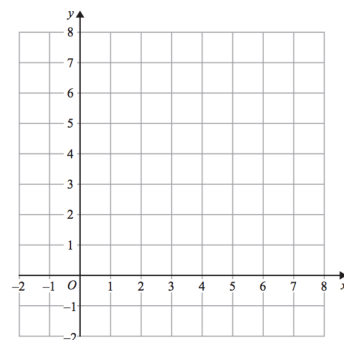
(f)



Question 4: Draw lines with the following gradients

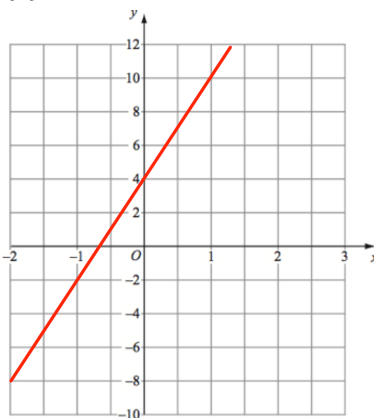
(a) $2\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{5}$ (d) $-\frac{1}{6}$

(e) $\frac{3}{10}$ (f) $\frac{4}{5}$ (g) $1\frac{1}{3}$ (h) $-\frac{3}{5}$

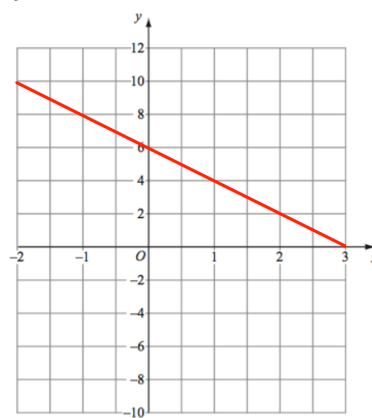


Question 5: Find the gradient of each of these lines

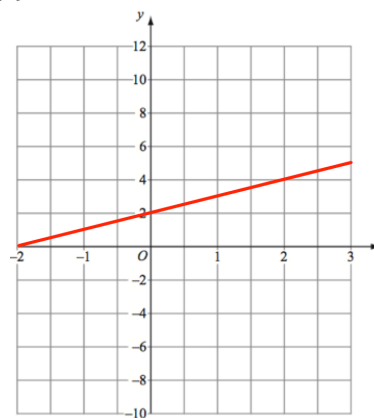
(a)



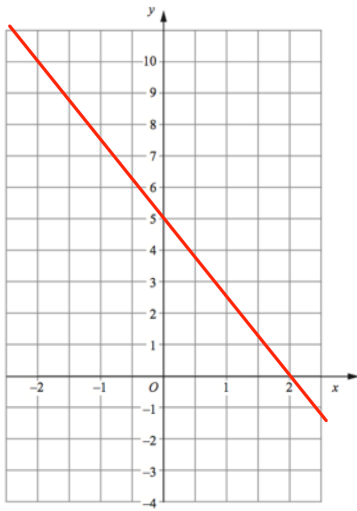
(b)



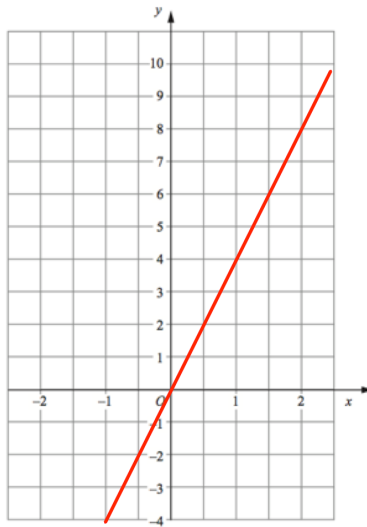
(c)



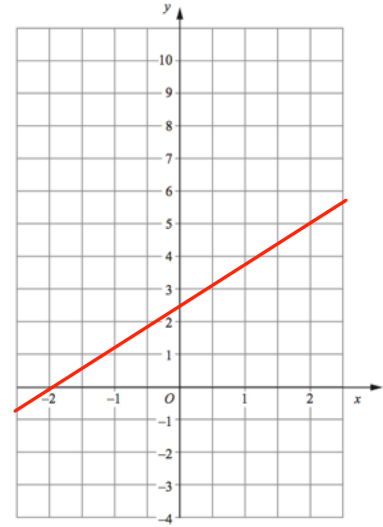
(d)



(e)

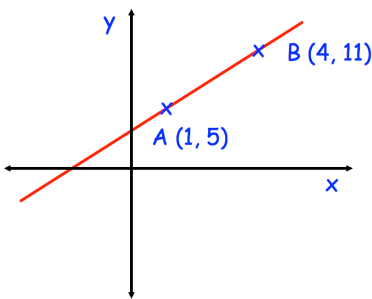


(f)

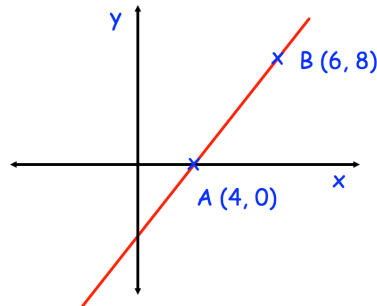


Question 6: Find the gradient of each line shown below

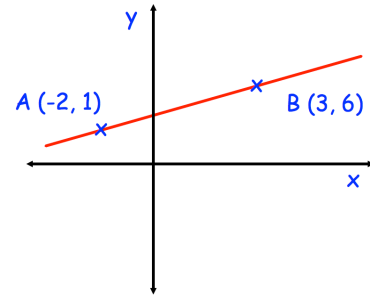
(a)



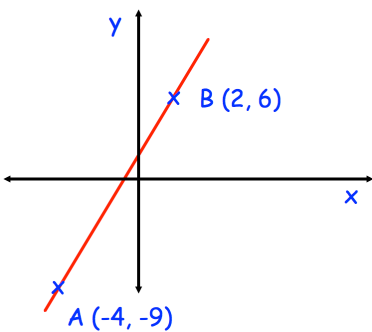
(b)



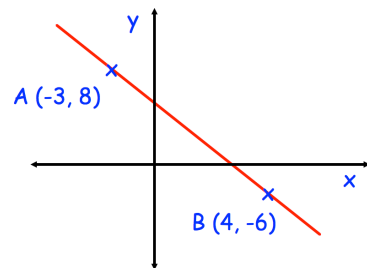
(c)



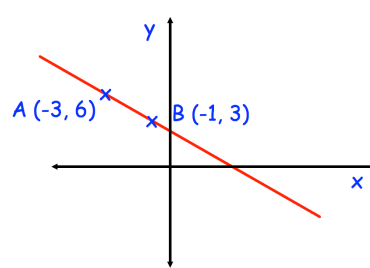
(d)



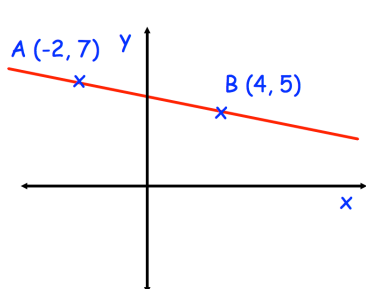
(e)



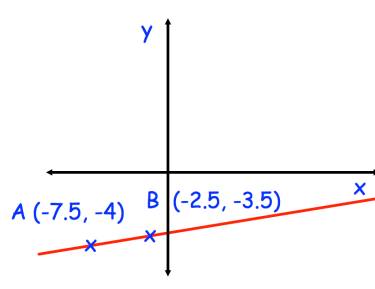
(f)



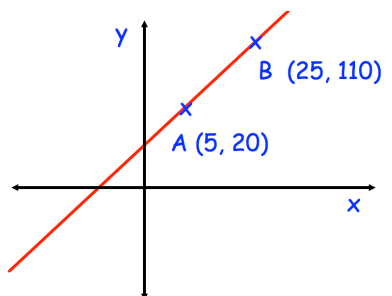
(g)



(h)



(i)

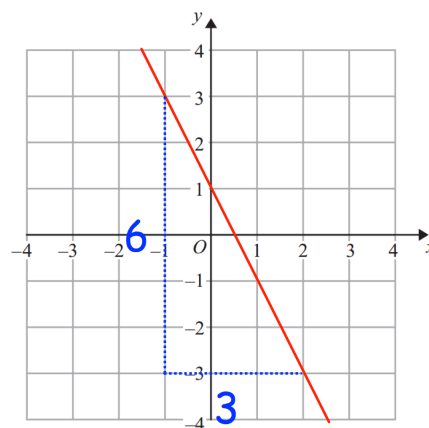


Question 7: Work out the gradient of the line passing through these pairs of points

- (a) (1, 4) and (3, 10) (b) (0, 0) and (3, 12) (c) (5, -2) and (9, 14)
- (d) (-8, 6) and (0, -2) (e) (-5, -9) and (1, 3) (f) (-7, -2) and (1, -4)
- (g) (-2, 1) and (8, -7) (h) (-2, 9) and (4, 7) (i) (-4.5, 3) and (6, -7.5)

Apply

Question 1: Alisha says that the gradient of the line is 2.
Explain her mistake.



Question 2: Find the gradient of the line passing through the points $(4a, -a)$ and $(6a, 5a)$

Question 3: The line passing through $(5, -2)$ and $(8, c)$ has a gradient of 3.
Find c .

Question 4: The line passing through $(-8, -9)$ and $(-2, h)$ has a gradient of 4.
Find h .

Question 5: The line passing through $(3, -4)$ and $(m, 10)$ has a gradient of 2.
Find m .

Question 6: The line passing through $(-2, 5)$ and $(2, n)$ has a gradient of $-\frac{1}{2}$
Find n .

Question 7: The line passing through $(1, p)$ and $(5, 1)$ has a gradient of 0.75
Find p .

Question 8: Find the equation of the line shown below

