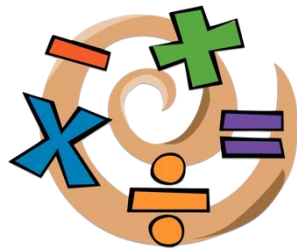


**St Andrew's Academy**

**Mathematics Department**



***National 4 Mathematics***

***ADDED VALUE PRACTICE***

# Added Value Unit Assessment Practice

A bank of eight Added Value Unit Assessment Practice Tests. These have been written in accordance with the SQA guidelines contained in **Mathematics Test (National 4) Added Value Unit Specification**, as listed below. The test will consist of two parts, in one of which a calculator may be used.

## **Part 1: Calculator must not be used. Time allowed: 20 minutes**

The questions should be in an appropriate context and cover the following:

- ▶ use of whole number percentages
- ▶ calculation of the mean of a data set; the mean should require division of a whole number by a single-digit whole number and rounding of the answer to two decimal places
- ▶ calculating a non-unitary fraction of a quantity
- ▶ adding two decimal numbers and then subtracting from the result
- ▶ multiplying a decimal number by a whole number

## **Part 2: Calculator may be used. Time allowed: 40 minutes**

The questions should be in an appropriate context and cover the following:

- ▶ solving a linear equation requiring simplification
- ▶ solving a problem using area or volume
- ▶ creating and then using a formula
- ▶ using the relationship involving speed, distance and time, where the time is given or calculated as hours and minutes
- ▶ use of Pythagoras' Theorem in a problem
- ▶ use of trigonometry to calculate a side or angle of a right-angled triangle
- ▶ solving a problem involving shape and coordinates

Four of these questions should contain an aspect of mathematical reasoning.

## **Using the tests**

These practice tests have been presented so that they can be photocopied, either on a single sheet of paper, back-to-back, or as two separate pages. If students do the test on loose-leaf paper, it can be added to their portfolio and the photocopied tests can be used again. You will hopefully be able to establish a system which is efficient and is cost effective.

You may find that your students are best prepared by doing a mock test first using these tests for practice, then undertaking any necessary remedial work before taking the SQA National 4 Added Value Test. Part One and Part Two may be done either consecutively on the same day or, due to time or other constraints, it may be necessary for students to take the test over two sessions.

## **Possible strategy for the final test:**

- ▶ Do a test under conditions specified by SQA.
- ▶ Mark the test according to SQA guidelines. Answers to the tests are given on Page 63.
- ▶ The test can be graded using the A, B, C, D system outlined in the record-keeping section on Page 71.
- ▶ Add the test results to the student's record sheet.
- ▶ Add the student's work to their portfolio of work.

Eventually, or from the outset, you may wish to write your own Added Value Unit Assessment Tests.

# Added Value Unit

PRACTICE



T E S T

## Part One

**Time allowed:** 20 minutes

You may **not** use a calculator for this part of the test.

1. A pizza takeaway sells 500 pizzas a week.  
80% of the pizzas have a cheese topping.  
How many pizzas sold each week have a cheese topping?
2. Kevin got a job picking tomatoes and putting them into boxes.  
Each of the 7 boxes of tomatoes he filled was weighed and the results recorded.  
42 kg, 41 kg, 32 kg, 50 kg, 39 kg, 36 kg, 32 kg  
Find the mean weight of a box of tomatoes.  
Give your answer, in kilograms, correct to 2 decimal places.
3. 48 girls applied to go on a canoeing course.  
 $\frac{2}{3}$  of the girls went on the course.  
How many girls went on the canoeing course?
4. A crane lifts a load 5.72 metres off the ground and stops.  
The load is then lifted a further 13.8 metres higher, before being lowered by 6.47 metres.  
How far is the load from the ground?
5. A calculator costs £7.95.  
Find the cost of 6 calculators.

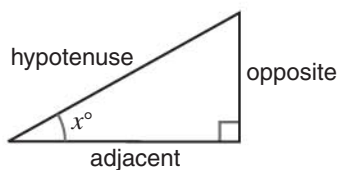
### FORMULAE LIST:

Circumference of a circle:  $C = \pi d$

Area of a circle:  $A = \pi r^2$

Volume of a triangular prism:  $V = Ah$

### TRIGONOMETRY RATIOS IN A RIGHT-ANGLED TRIANGLE:

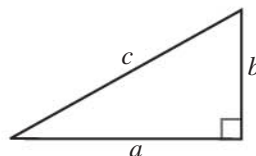


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

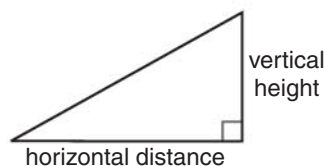
$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

### THEOREM OF PYTHAGORAS:



$$a^2 + b^2 = c^2$$

### GRADIENT:



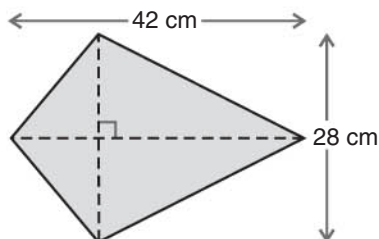
$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

## Part Two

**Time allowed:** 40 minutes

You may use a calculator for this part of the test.

6. Solve.
- (a)  $4x = 20 - x$
- (b)  $4(x + 1) = 16$



7. A badge is made in the shape of a kite. Find the area of the badge.

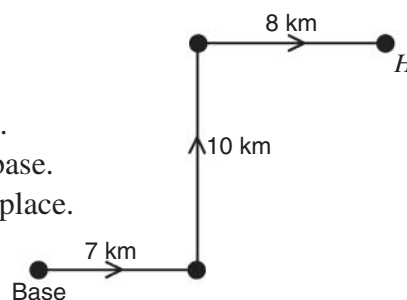
8. A number sequence begins: 3, 7, 11, 15, ...

Term	1	2	3	4	5	6
Number	3	7	11	15		

- (a) Write down the next two numbers in this sequence.
- (b) Write down a formula that can be used to find any term in the sequence.
- (c) Use your formula to find the 12th term in the sequence.

9. A lorry travels 100 miles in 2 hours 30 minutes. Find its average speed in miles per hour.

10. A helicopter flies 7 km east from its base. It then heads north for 10 km, followed by east for 8 km. Calculate the direct distance from the helicopter to the base. Give your answer in kilometres, correct to one decimal place.



11. Jason is standing 12 m from a haystack. The angle of elevation to the top of the haystack is  $25^\circ$ . Calculate  $h$ , the height of the haystack. Give your answer in metres, correct to one decimal place.

12. On squared paper, draw and label the  $x$  axis from  $-4$  to  $6$  and the  $y$  axis from  $-4$  to  $3$ .
- (a) Plot the points:  $A(-4, -4)$ ,  $B(-2, 2)$  and  $D(4, -4)$ .
- (b) Plot point  $C$  so that  $ABCD$  is a parallelogram.

# Added Value Unit

PRACTICE

# B

T E S T

## Part One

**Time allowed:** 20 minutes

You may **not** use a calculator for this part of the test.

1. A packet of biscuits contains 40 biscuits.  
Toby eats 5% of the biscuits.  
How many biscuits are left in the packet?
2. Sarah collected 6 pine cones.  
She measured the height of each cone and recorded her results.  
12 cm, 17 cm, 12 cm, 18 cm, 11 cm, 10 cm  
Find the mean height of a pine cone.  
Give your answer, in centimetres, correct to 2 decimal places.
3. 35 boys applied to go on a catering course run by a hotel.  
 $\frac{2}{7}$  of the boys went on the course.  
How many boys went on the catering course?
4. Harold mixes 1.25 litres of water with 7.8 litres of emulsion paint.  
He calculated that 8.7 litres of the mixture are required to paint a wall.  
Has Harold mixed enough water and emulsion to paint the wall?  
Explain your answer.
5. A geometry set costs £4.45.  
Find the cost of 8 geometry sets.

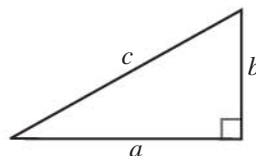
### FORMULAE LIST:

Circumference of a circle:  $C = \pi d$

Area of a circle:  $A = \pi r^2$

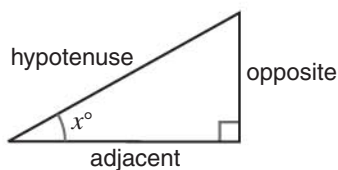
Volume of a triangular prism:  $V = Ah$

### THEOREM OF PYTHAGORAS:



$$a^2 + b^2 = c^2$$

### TRIGONOMETRY RATIOS IN A RIGHT-ANGLED TRIANGLE:

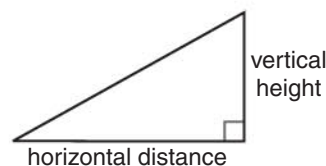


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

### GRADIENT:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

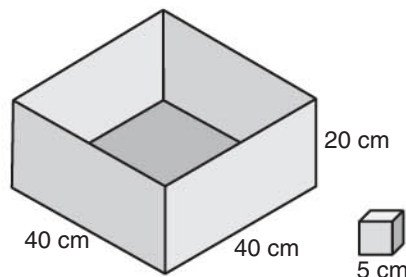
## Part Two

**Time allowed:** 40 minutes

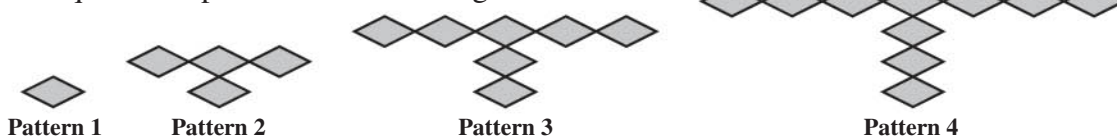
You may use a calculator for this part of the test.

6. Solve. (a)  $3x - 10 = x$       (b)  $2(x - 3) = 18$

7. How many cubes of edge 5 cm can be packed into a cuboid which has dimensions 40 cm by 40 cm by 20 cm?



8. A sequence of patterns is made using diamonds.



(a) Copy and complete the table.

Pattern number ( $p$ )	1	2	3	4	5	6
Number of diamonds ( $d$ )	1	4	7			

(b) Write down a formula for calculating the number of diamonds ( $d$ ) when you know the pattern number ( $p$ ).

(c) How many diamonds are needed for Pattern 100?

9. A train travels 140 miles at an average speed of 80 miles per hour.

Calculate how long the journey took.

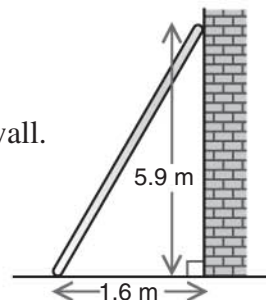
Give your answer in hours and minutes.

10. A ladder is placed on level ground, 1.6 m away from a vertical wall.

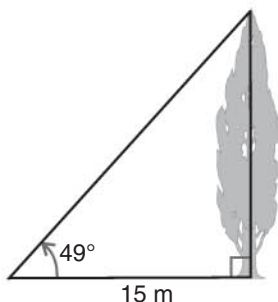
The ladder reaches 5.9 m up the wall.

Calculate the length of the ladder.

Give your answer, in metres, correct to 2 decimal places.



11.



From a point on the ground 15 m from the base of a tree, the angle of elevation to the top of a tree is  $49^\circ$ .

Calculate the height of the tree.

Give your answer in metres, correct to one decimal place.

12. On graph paper, draw and label  $x$  and  $y$  axes from  $-5$  to  $5$ .

(a) Plot the points:  $P(-3, 1)$ ,  $Q(1, 4)$  and  $R(4, 0)$ .

(b)  $PQRS$  is a square.

Plot the position of point  $S$  on your graph.

## Part One

**Time allowed:** 20 minutes

You may **not** use a calculator for this part of the test.

- Jenny is a salesperson.  
Each month Jenny earns a bonus of 3% of the value of goods she sells.  
In July, Jenny sold goods to the value of £4500.  
How much bonus did Jenny earn in July?
- The number of goals scored in matches played by some hockey teams are shown.  
3, 1, 4, 2, 2, 3, 2, 6  
Find the mean number of goals scored.  
Give your answer correct to 2 decimal places.
- A box contains 40 chocolates.  
 $\frac{5}{8}$  of the chocolates are soft-centred.  
How many chocolates in the box are soft-centred?
- Mary has two containers of plain flour.  
One contains 2.35 kg and the other contains 1.415 kg.  
Mary uses 3.2 kg of flour to bake a cake.  
How much flour will Mary have left?
- A tin of paint costs £13.85.  
Find the cost of 3 tins of paint.

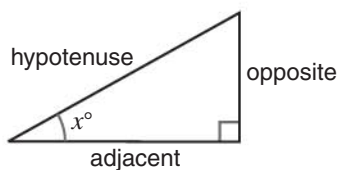
### FORMULAE LIST:

Circumference of a circle:  $C = \pi d$

Area of a circle:  $A = \pi r^2$

Volume of a triangular prism:  $V = Ah$

### TRIGONOMETRY RATIOS IN A RIGHT-ANGLED TRIANGLE:

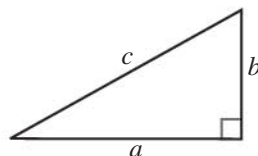


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

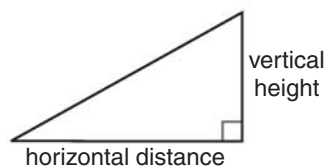
$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

### THEOREM OF PYTHAGORAS:



$$a^2 + b^2 = c^2$$

### GRADIENT:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

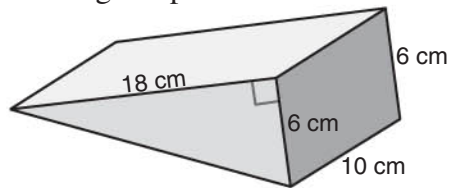
## Part Two

**Time allowed:** 40 minutes

You may use a calculator for this part of the test.

6. Solve. (a)  $3x - 4 = x + 4$       (b)  $3(2x + 1) = 15$

7. The diagram shows a plastic wedge which is a triangular prism. Calculate the volume of the plastic wedge.



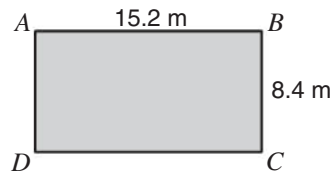
8. A number sequence begins: 2, 6, 10, 14, ...

Term	1	2	3	4	5	6
Number	2	6	10	14		

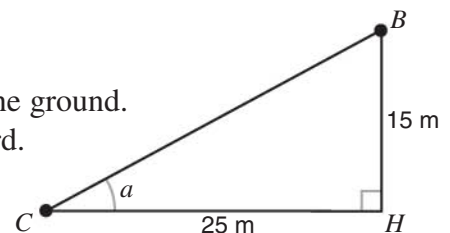
- (a) Write down the next two numbers in this sequence.  
 (b) Write a formula that can be used to find any term in the sequence.  
 (c) Use your formula to find the 20th term in the sequence.

9. Calculate the distance that Chris cycles in 1 hour and 15 minutes at an average speed of 24 kilometres per hour.

10. A builder marks out a rectangular building plot,  $ABCD$ . He checks that the plot is rectangular by measuring the diagonals,  $AC$  and  $BD$ . What length should they be? Give your answer in metres, correct to 2 decimal places.



11. A cat is on the ground, 25 m from the foot of a house. A bird is perched on the gutter of the house, 15 m from the ground. Calculate the angle of elevation,  $a$ , from the cat to the bird. Give your answer correct to the nearest degree.



12. On squared paper, draw and label the  $x$  axis from  $-4$  to  $6$  and the  $y$  axis from  $-6$  to  $3$ .  
 (a) Plot the points:  $B(-4, -2)$ ,  $C(4, 2)$  and  $D(6, -2)$ .  
 (b) Plot point  $A$  so that  $ABCD$  is a kite.



## Part One

**Time allowed:** 20 minutes

You may **not** use a calculator for this part of the test.

- David gets a trade discount of 20% on purchases made at his local timber store. He buys some fence posts costing £125 before discount. How much does David pay for the fence post after his trade discount is applied?
- Louise recorded the cost given by six Internet sites for delivering a birthday card.  
£2, £7, £5, £8, £7, £6  
Find the mean of these costs.  
Give your answer to the nearest penny.
- Lisa has 36 balloons.  
She sells  $\frac{2}{9}$  of them.  
How many balloons has she got left?
- A decorator mixes filler with a hardening compound to repair a wall. He mixes 2.275 kg of filler with 0.75 kg of hardening compound. After repairing the wall, he has 0.18 kg of mixture left. How much mixture was used to repair the wall?
- A car travels 26.8 km on one litre of petrol. How far will the car travel on 4 litres of petrol?

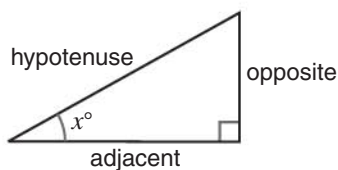
### FORMULAE LIST:

Circumference of a circle:  $C = \pi d$

Area of a circle:  $A = \pi r^2$

Volume of a triangular prism:  $V = Ah$

### TRIGONOMETRY RATIOS IN A RIGHT-ANGLED TRIANGLE:

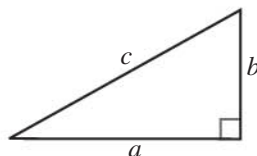


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

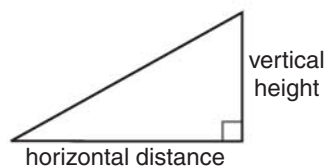
$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

### THEOREM OF PYTHAGORAS:



$$a^2 + b^2 = c^2$$

### GRADIENT:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

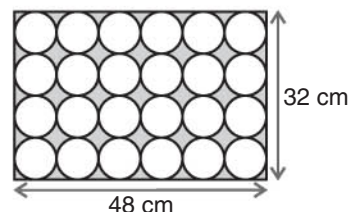
## Part Two

**Time allowed:** 40 minutes

You may use a calculator for this part of the test.

6. Solve. (a)  $7x + 3 = 2x + 28$  (b)  $2(1 + 3x) = 38$

7. A rectangular sheet of pastry measures 48 cm by 32 cm. Laura uses a circular pastry cutter to cut lids for mince pies. The pastry cutter has a diameter of 8 cm. Calculate the area of pastry **not** used. Give your answer to the nearest square centimetre.



8. Patterns are made using matches.



Pattern 1



Pattern 2



Pattern 3

- (a) Copy and complete the table for Pattern 4 and Pattern 5.

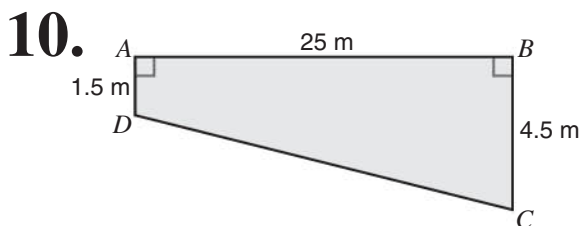
Pattern number	1	2	3	4	5
Number of matches	6	8	10		

- (b) Here is a rule for working out the number of matches in a pattern:

**“Multiply the pattern number by 2 and add 4.”**

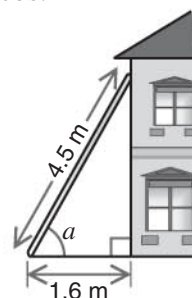
How many matches are used to make Pattern 80?

9. Kelly cycles 36 kilometres in 4 hours 30 minutes. Calculate her average speed in kilometres per hour.



The floor of a swimming pool slopes steadily from a depth of 1.5 m to 4.5 m. The pool is 25 m long. Find the length of the sloping floor of the pool,  $CD$ . Give your answer in metres, correct to 2 decimal places.

11. A ladder, 4.5 m long, is placed against the wall of a house. The foot of the ladder is 1.6 m away from the base of the wall. Calculate the angle,  $a$ , the ladder makes with the ground. Give your answer correct to one decimal place.



12. On squared paper, draw and label the  $x$  axis from  $-7$  to  $7$  and the  $y$  axis from  $-4$  to  $4$ .  
 (a) Plot the points:  $A(-6, -2)$ ,  $B(-3, 3)$  and  $C(6, 3)$ .  
 (b)  $ABCD$  is a parallelogram. Plot the position of point  $D$  on your graph.

# Added Value Unit

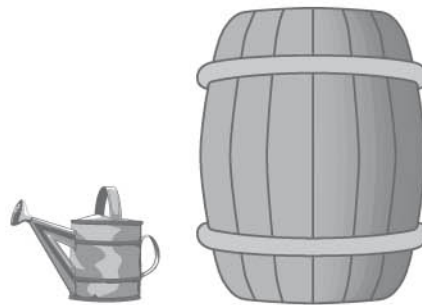
## PRACTICE E TEST

### Part One

**Time allowed:** 20 minutes

You may **not** use a calculator for this part of the test.

- 25% of the price of a CD is paid to a company for the design and manufacture of its packaging. How much is the company paid for a CD priced at £10?
- The lateness of 8 trains was recorded. The results, in minutes, are shown.  
5, 7, 8, 10, 10, 11, 12, 14  
Find the mean lateness for these trains.  
Give your answer, in minutes, correct to 2 decimal places.
- Sheila has 42 postage stamps.  
 $\frac{5}{6}$  of the stamps are First Class.  
How many First Class stamps does Sheila have?
- A barrel contains 13.7 litres of water. Petra adds 21.8 litres of water to the barrel. She then fills her watering can with 9.85 litres of water from the barrel. How much water is left in the barrel?
- An electrician cut 5 lengths of cable, each 17.6 metres long. What is the total length of the five cables?



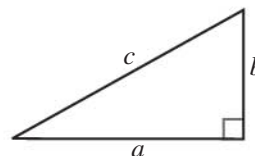
#### FORMULAE LIST:

Circumference of a circle:  $C = \pi d$

Area of a circle:  $A = \pi r^2$

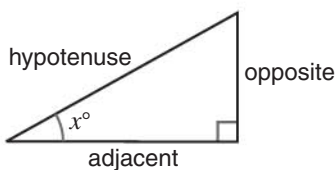
Volume of a triangular prism:  $V = Ah$

#### THEOREM OF PYTHAGORAS:



$$a^2 + b^2 = c^2$$

#### TRIGONOMETRY RATIOS IN A RIGHT-ANGLED TRIANGLE:

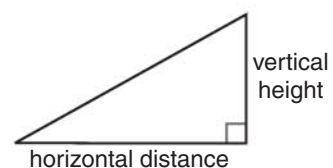


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

#### GRADIENT:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

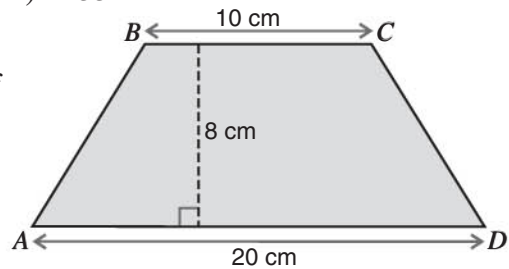
## Part Two

**Time allowed:** 40 minutes

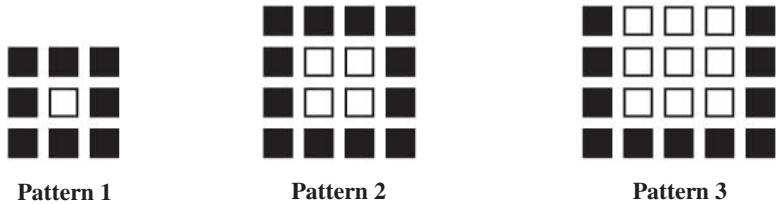
You may use a calculator for this part of the test.

6. Solve. (a)  $7x - 2 = 3x + 30$  (b)  $5(x - 2) = 35$

7. A scraper, used in cabinet work, is in the shape of a trapezium.  
 $AD = 20\text{ cm}$ ,  $BC = 10\text{ cm}$  and  $AB = CD$ .  
 Find the area of the trapezium.



8. A pattern is made using black and white tiles.



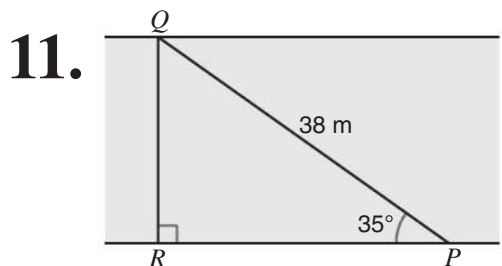
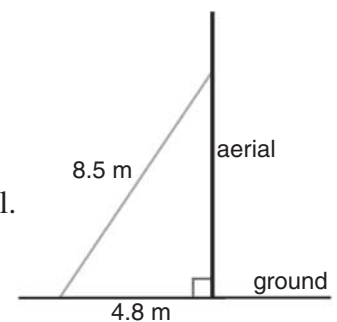
- (a) Copy and complete the table for Pattern 3 and Pattern 4.

Pattern number ( $n$ )	1	2	3	4
Number of black tiles ( $b$ )	8	12		

- (b) Write down a formula for calculating the number of black tiles ( $b$ ) when you know the pattern number ( $n$ ).  
 (c) Use your formula to find the number of black tiles in Pattern 20.

9. Craig drives 27 miles to work. His journey takes 45 minutes.  
 What is Craig's average speed in miles per hour?

10. A wire used to keep a vertical aerial steady is 8.5 m long.  
 It is attached to the aerial, 3 metres from the top of the aerial.  
 The wire is fixed to level ground, 4.8 m from the base of the aerial.  
 Find the height of the aerial.  
 Give your answer in metres, correct to one decimal place.



- The diagram shows a river.  
 A boat travels 38 m in crossing the river from  $P$  to  $Q$ .  
 Its course makes an angle of  $35^\circ$  with the river bank.  
 Find the width of the river,  $QR$ .  
 Give your answer in metres, correct to one decimal place.

12. On squared paper, draw and label the  $x$  axis from  $-4$  to  $10$  and the  $y$  axis from  $-6$  to  $7$ .  
 (a) Plot the points:  $A(2, -5)$ ,  $B(-2, -1)$  and  $C(5, 6)$ .  
 (b) Plot point  $D$  so that  $ABCD$  is a rectangle.

# Added Value Unit

PRACTICE

# F

T E S T

## Part One

**Time allowed:** 20 minutes

You may **not** use a calculator for this part of the test.

1. Reg scored 90% in a history test.  
How many marks did Reg get out of 60?
2. Three people took part in a sponsored swim.  
The number of lengths completed by each person was recorded.  
28, 17, 34  
Calculate the mean number of lengths completed by each person.  
Give your answer correct to 2 decimal places.
3. In a sale, all prices are reduced by  $\frac{3}{10}$ .  
A boxed DVD set was originally priced at £25.  
How much will it cost in the sale?
4. Staff at a warehouse are told not to lift weights greater than 14.75 kg.  
Richard lifts boxes *A* and *B* at the same time.  
By what weight has Richard exceeded the safety limit?  
Give your answer in kilograms.
5. A recipe to make a loaf of bread uses 0.455 litres of water.  
How many litres of water are needed to make 7 loaves of bread?



7.48 kg



9.275 kg

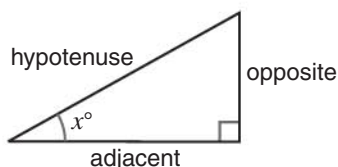
### FORMULAE LIST:

Circumference of a circle:  $C = \pi d$

Area of a circle:  $A = \pi r^2$

Volume of a triangular prism:  $V = Ah$

### TRIGONOMETRY RATIOS IN A RIGHT-ANGLED TRIANGLE:

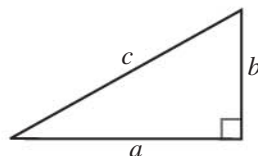


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

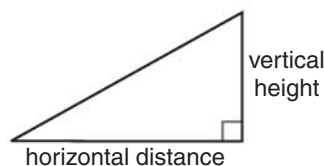
$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

### THEOREM OF PYTHAGORAS:



$$a^2 + b^2 = c^2$$

### GRADIENT:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

# Added Value Unit

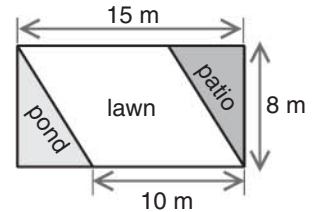
## Part Two

**Time allowed:** 40 minutes

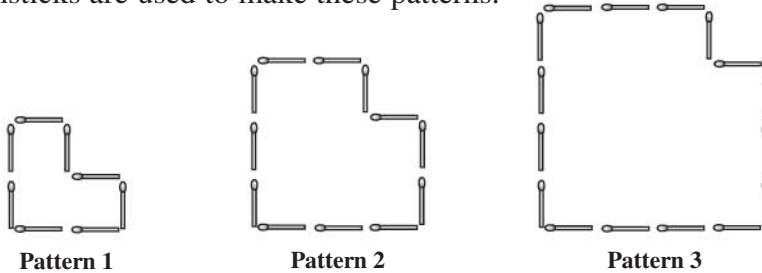
You may use a calculator for this part of the test.

6. Solve. (a)  $4x - 2 = 19 + x$  (b)  $4(1 + 2x) = 36$

7. A rectangular garden measures 15 m by 8 m. The lawn is in the shape of a parallelogram. Calculate the area of the lawn. You must show your working.



8. Matchsticks are used to make these patterns.

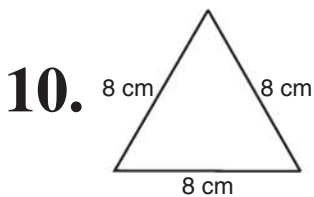


(a) Copy and complete this table.

Pattern number ( $n$ )	1	2	3	4	5
Number of matchsticks ( $m$ )	8	12	16		

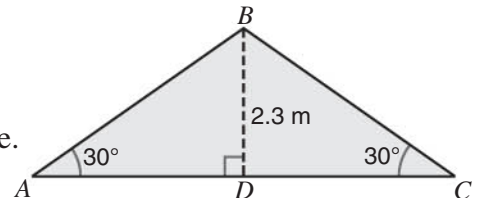
- (b) Write down a formula for calculating the number of matches ( $m$ ) when you know the pattern number ( $n$ ).  
 (c) Which pattern number is made using 112 matchsticks?

9. Harvey drove 130 miles at an average speed of 40 miles per hour. Calculate how long Harvey took for the journey. Give your answer in hours and minutes.



10. Find the height of an equilateral triangle of side 8 cm. Give your answer correct to the nearest millimetre.

11. The diagram shows the side view of the roof of a house. Calculate the width,  $AC$ , of the house. Give your answer in metres, correct to one decimal place.



12. On squared paper, draw and label the  $x$  axis from  $-5$  to  $10$  and the  $y$  axis from  $-3$  to  $5$ .  
 (a) Plot the points:  $A(-4, -2)$ ,  $B(-2, 4)$  and  $D(6, -2)$ .  
 (b)  $ABCD$  is a trapezium in which  $AD$  is parallel to  $BC$ ,  $AD$  is 10 units long and  $BC$  is 5 units long. Plot the position of point  $C$ .

# Added Value Unit

PRACTICE

# G

T E S T

## Part One

**Time allowed:** 20 minutes

You may **not** use a calculator for this part of the test.

1. A packet of seeds produces either blue or yellow flowers.  
A label on the packet says:  
*75% of seeds produce blue flowers.*  
Each packet contains 60 seeds.  
How many yellow flowers are produced from a packet of seeds?
2. The weights of three parcels were recorded in kilograms.  
13, 17, 32  
Find the mean weight of a parcel.  
Give your answer, in kilograms, correct to 2 decimal places.
3. A bar of chocolate has 24 squares.  
Grace eats  $\frac{3}{4}$  of the bar.  
How many squares does Grace eat?
4. In the qualifying round of a bobsleigh competition, the times of two runs are added together.  
A team records times of 67.245 seconds and 66.895 seconds.  
To qualify for the next round, the total time must be less than 133.5 seconds.  
The team failed to qualify for the next round.  
By how much did they exceed the qualifying time?  
Give your answer in seconds.
5. Abigail earns £8.26 an hour.  
How much is she paid for working 9 hours?

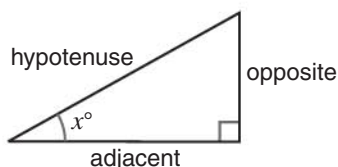
### FORMULAE LIST:

Circumference of a circle:  $C = \pi d$

Area of a circle:  $A = \pi r^2$

Volume of a triangular prism:  $V = Ah$

### TRIGONOMETRY RATIOS IN A RIGHT-ANGLED TRIANGLE:

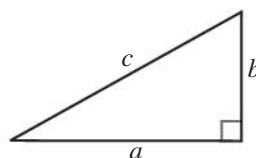


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

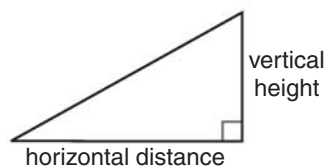
$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

### THEOREM OF PYTHAGORAS:



$$a^2 + b^2 = c^2$$

### GRADIENT:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

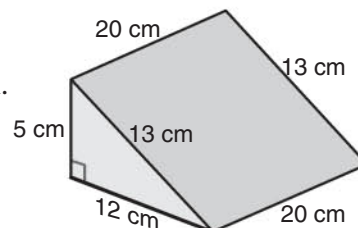
## Part Two

**Time allowed:** 40 minutes

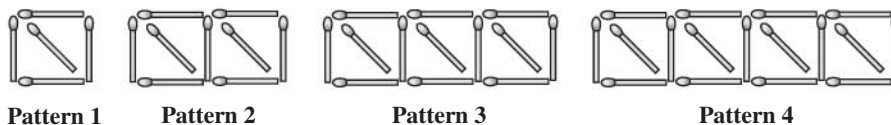
You may use a calculator for this part of the test.

6. Solve.
- (a)  $3 + 4x = 2x + 23$
- (b)  $5(2x + 1) = 55$

7. The diagram shows a wooden wedge which is a triangular prism. The wedge has to be painted all over. Calculate the total surface area of the wooden wedge.



8. Matches are used to make these patterns.

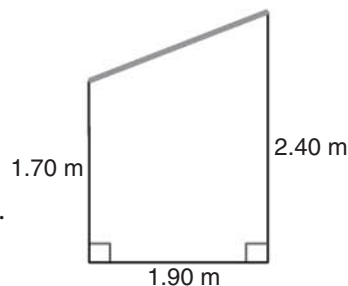


Pattern number ( $n$ )	1	2	3	4	5	6
Number of matchsticks ( $m$ )	5	9	13	17		

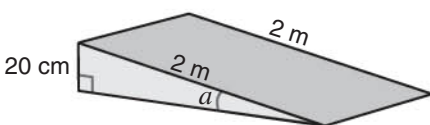
- (a) Find the number of matches used to make Pattern 5 and Pattern 6.
- (b) Write down a formula for calculating the number of matches ( $m$ ) used to make the  $n$ th pattern.
- (c) How many matches are used to make Pattern 50?

9. Felicity lives 2.4 km from school. How many minutes does she take to walk to school if her average walking speed is 4 km/h?

10. The diagram shows the side view of a garden shed. Find the length of the sloping roof. Give your answer in metres, correct to 2 decimal places.



11. An access ramp has length 2 m and vertical height 20 cm. Find the angle the ramp makes with the level ground. Give your answer correct to one decimal place.



12. On squared paper, draw and label the  $x$  axis from  $-8$  to  $10$  and the  $y$  axis from  $-3$  to  $5$ .
- (a) Plot the points:  $A(-7, -2)$ ,  $B(-2, 4)$  and  $D(4, -2)$ .
- (b)  $ABCD$  is a parallelogram in which  $AD$  is parallel to  $BC$  and  $AB$  is parallel to  $DC$ . Plot the position of point  $C$ .



# Added Value Unit

PRACTICE

H

T E S T

## Part One

**Time allowed:** 20 minutes

You may **not** use a calculator for this part of the test.

- 60% of the traffic on the M74 is cars.  
Zoe counted 200 vehicles in 20 minutes.  
How many of the vehicles were cars?
- A greengrocer sold apples in bags.  
Each bag contained 6 apples.  
Ivan weighed each apple in one bag and recorded his results in grams.  
101, 107, 105, 109, 110, 102  
Find the mean weight of an apple.  
Give your answer, in grams, correct to two decimal places.
- A necklace is made from 60 beads.  
 $\frac{3}{5}$  of the beads are yellow.  
How many of the beads are **not** yellow?
- A farmer had two rolls of barbed wire.  
On the first roll there was 57.68 m of wire.  
On the second roll there was 38.73 m of wire.  
He used 76.5 m of wire to repair some fences.  
How much barbed wire does he have left?  
Give your answer in metres.
- A car is 3.78 metres long.  
5 cars are parked bumper to bumper, with no gaps between them.  
What is the total length of the 5 cars?

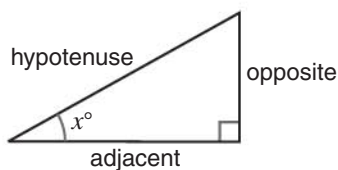
### FORMULAE LIST:

Circumference of a circle:  $C = \pi d$

Area of a circle:  $A = \pi r^2$

Volume of a triangular prism:  $V = Ah$

### TRIGONOMETRY RATIOS IN A RIGHT-ANGLED TRIANGLE:

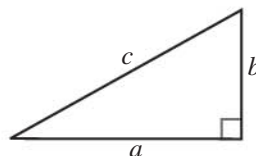


$$\tan x^\circ = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin x^\circ = \frac{\text{opposite}}{\text{hypotenuse}}$$

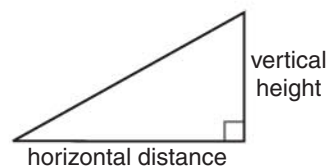
$$\cos x^\circ = \frac{\text{adjacent}}{\text{hypotenuse}}$$

### THEOREM OF PYTHAGORAS:



$$a^2 + b^2 = c^2$$

### GRADIENT:



$$\text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}}$$

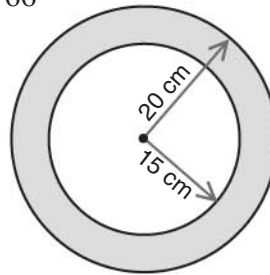
## Part Two

**Time allowed:** 40 minutes

You may use a calculator for this part of the test.

6. Solve. (a)  $8x - 3 = 53$       (b)  $6(3 + 2x) = 66$

7. A signmaker makes a ring using plywood.  
The inner radius is 15 cm.  
The outer radius is 20 cm.  
Calculate the area of plywood to be painted.  
Give your answer to the nearest square centimetre.



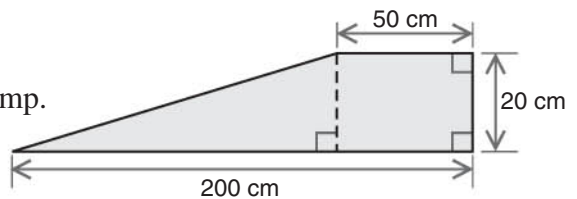
8. A number pattern begins: 2, 5, 8, 11, ...

Term	1	2	3	4	5	6
Number	2	5	8	11		

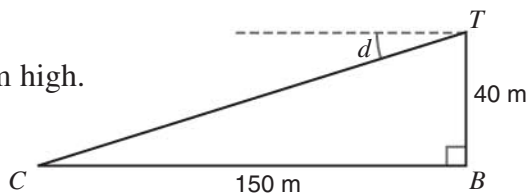
- (a) Write down the 5th and 6th terms in the sequence.  
(b) Write a formula that can be used to find any term in the sequence.  
(c) Use your formula to find the 30th number in the pattern.

9. Simon started his journey at 0945.  
He travelled 175 km at an average speed of 50 km/h.  
At what time did his journey end?

10. The diagram shows the side view of an access ramp.  
The ramp is 200 cm long and 20 cm high.  
The top of the ramp is 50 cm long.  
Calculate the length of the sloping part of the ramp.  
Give your answer in centimetres, correct to one decimal place.



11. A tower is 40 m high.



From the top of the tower, a car can be seen which is 150 m away from the base of the tower.  
What is the size of the angle of depression,  $d$ , from the top of the tower to the car?  
Give your answer correct to the nearest degree.

12. On squared paper, draw and label the  $x$  axis from  $-5$  to  $5$  and the  $y$  axis from  $-4$  to  $4$ .  
(a) Plot the points:  $A(-4, 1)$  and  $C(2, 1)$ .  
(b)  $AC$  is the diagonal of a square,  $ABCD$ .  
The  $y$  coordinate of  $B$  is  $4$ .  
Plot points  $B$  and  $D$ .

PRACTICE

# A

T E S T

## Added Value Unit

PART  
**1**

1. 400
2.  $\frac{272}{7} = 38.857 \dots = 38.86$  kg, to 2 d.p.
3. 32
4. 13.05 m
5. £47.70

PRACTICE

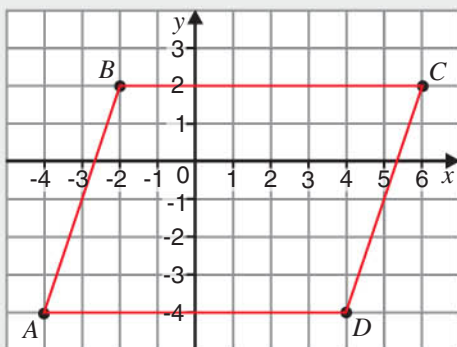
# A

T E S T

## Added Value Unit

PART  
**2**

6. (a)  $x = 4$                       (b)  $x = 3$
7.  $588 \text{ cm}^2$
8. (a) 19, 23                      (b)  $n$ th term =  $4n - 1$                       (c) 47
9. 40 miles per hour
10. 18.0 km
11. 5.6 m
12. (a)



- (b)  $D(6, 2)$

# Added Value Unit

1. 38
2.  $\frac{80}{6} = 13.333 \dots = 13.33$  cm, to 2 d.p.
3. 10
4. Yes.  $1.25 + 7.8 - 8.7 = 0.35$ . There will be 0.35 litres of mixture left.
5. £35.60

# Added Value Unit

6. (a)  $x = 5$                       (b)  $x = 12$

7.  $8 \times 8 \times 4 = 256$  cubes

8. (a)

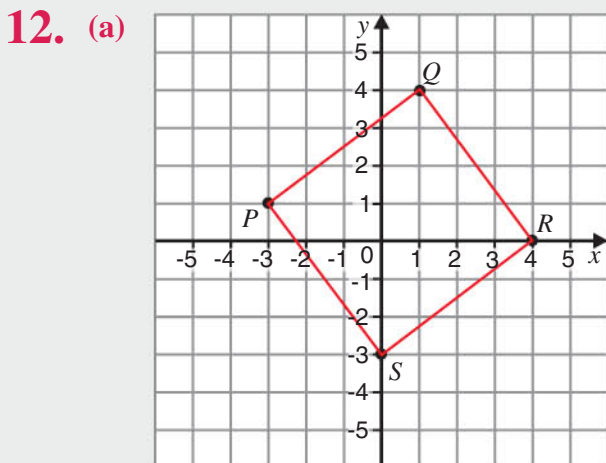
Pattern number ( $p$ )	1	2	3	4	5	6
Number of diamonds ( $d$ )	1	4	7	10	13	16

(b)  $d = 3p - 2$                       (c) 298

9. 1 hour 45 minutes

10. 6.11 m

11. 17.3 m



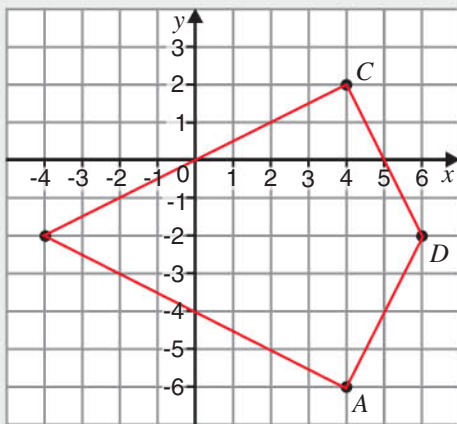
(b)  $S(0, -3)$

# Added Value Unit

1. £135
2.  $\frac{23}{8} = 2.875 \dots = 2.88$ , to 2 d.p.
3. 25
4. 0.565 kg
5. £41.55

# Added Value Unit

6. (a)  $x = 4$                       (b)  $x = 2$
7.  $540 \text{ cm}^3$
8. (a) 18, 22                      (b)  $n \text{th term} = 4n - 2$                       (c) 78
9. 30 km
10. 17.37 m
11.  $31^\circ$
12. (a)



- (b) A(4, -6)

# Added Value Unit

1. £100
2.  $\frac{35}{6} = 5.833 \dots = \text{£}5.83$ , to nearest penny.
3. 28
4. 2.845 kg
5. 107.2 km

# Added Value Unit

6. (a)  $x = 5$                       (b)  $x = 6$

7.  $330 \text{ cm}^2$

8. (a)

Pattern number	1	2	3	4	5
Number of matches	6	8	10	12	14

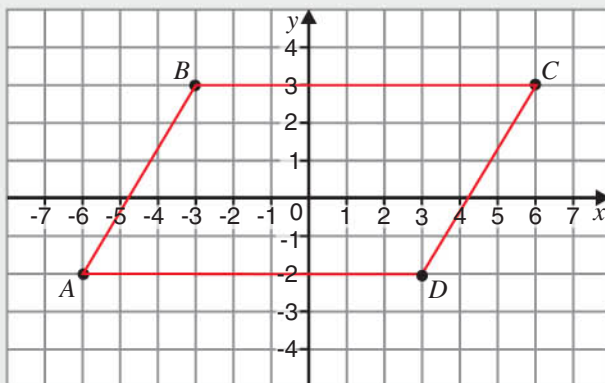
- (b) 164

9. 8 km

10. 25.18 m, to 2 d.p.

11.  $69.2^\circ$

12. (a)



- (b)  $D(3, -2)$

# Added Value Unit

1. £2.50
2.  $\frac{77}{8} = 9.625 \dots = 9.63$  minutes, to 2 d.p.
3. 35
4. 25.65 litres
5. 88 m

# Added Value Unit

6. (a)  $x = 8$                       (b)  $x = 9$

7.  $120 \text{ cm}^2$

8. (a)

Pattern number ( $n$ )	1	2	3	4
Number of black tiles ( $b$ )	8	12	16	20

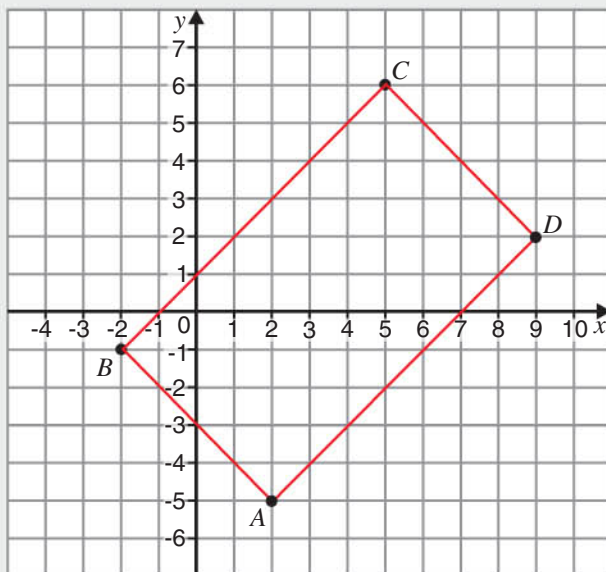
- (b)  $b = 4n + 4$       (c) 84

9. 36 miles per hour

10. 10.0 m

11. 21.8 m

12. (a)



- (b)  $D(9, 2)$

# Added Value Unit

1. 54
2.  $\frac{79}{3} = 26.333 \dots = 26.33$  lengths, to 2 d.p.
3. £17.50
4. 2.005 kg
5. 3.185 litres

# Added Value Unit

6. (a)  $x = 7$                       (b)  $x = 4$

7.  $80 \text{ cm}^2$

8. (a)

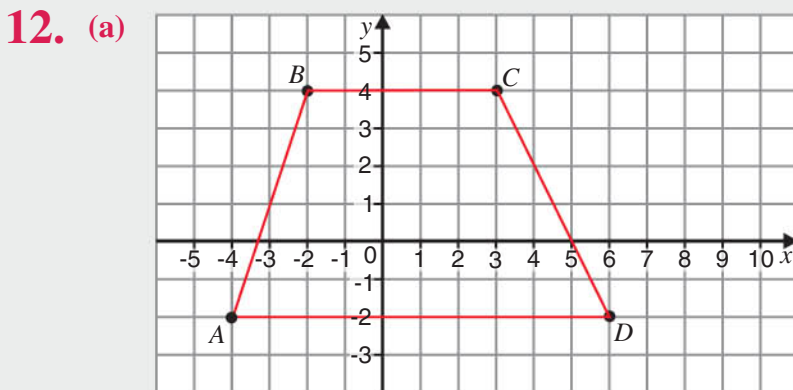
Pattern number ( $n$ )	1	2	3	4	5
Number of matchsticks ( $m$ )	8	12	16	20	24

- (b)  $m = 4n + 4$       (c) Pattern 27

9. 3 hours 15 minutes

10. 6.9 cm

11. 8.0 m



- (b)  $C(3, 4)$



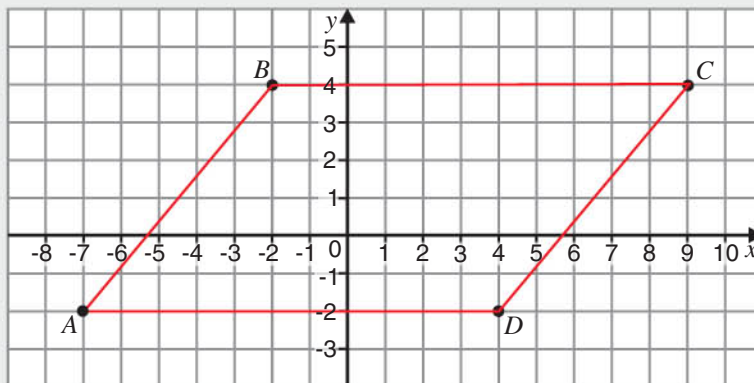
# Added Value Unit

1. 15
2.  $\frac{62}{3} = 20.666 \dots = 20.67 \text{ kg, to 2 d.p.}$
3. 18
4. 0.64 seconds
5. £74.34

# Added Value Unit

6. (a)  $x = 10$                       (b)  $x = 5$
7.  $660 \text{ cm}^2$
8. (a) Pattern 5: 21,    Pattern 6: 25                      (b)  $m = 4n + 1$                       (c) 201
9. 36 minutes
10. 2.02 m, to 2 d.p.
11.  $a = 5.7^\circ$

12. (a)



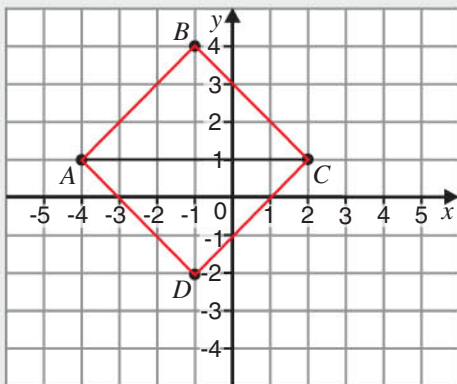
(b)  $D(9, 4)$

# Added Value Unit

1. 120
2.  $\frac{634}{6} = 105.666 \dots = 105.67$  g, to 2 d.p.
3. 24
4. 19.91 m
5. 18.9 m

# Added Value Unit

6. (a)  $x = 7$                       (b)  $x = 4$
7.  $550 \text{ cm}^2$
8. (a) Pattern 5: 14,    Pattern 6: 17                      (b)  $n$ th term =  $3n - 1$                       (c) 89
9. 1315
10.  $151.3 \text{ cm}$ , to 1 d.p.
11.  $15^\circ$
12. (a)



- (b)  $B(-1, 4), \quad D(-1, -2)$