100 Exam Questions

Mark = /10

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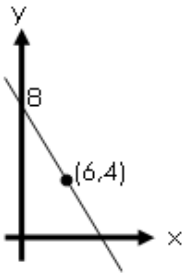
		My Working
1	Evaluate $6\frac{1}{5} - 2\frac{1}{3}$	
2	Find the equation of the line 	
3	Express $a^2(2a^{\frac{-1}{2}} + a)$ in its simplest form	
4	Solve $x - 2(x - 1) = 8$	
5	Solve $4sinx = 2$ for $0° < x < 360°$	

		My Working
6	Find the standard deviation for 3, 8, 14, 20 Give your answer to 3 significant figures	
7	Factorise fully $2x^2 - 32$	
8	A house is bought for £74,000, increases in value 4.5% every year for 3 years. What is its new value?	
9	A triangle has sides 83cm, 79cm and 19cm. Is it right angled?	
10	Find the roots of the equation $y = x^2 - x - 6$	

100 Exam Questions

Mark = /10

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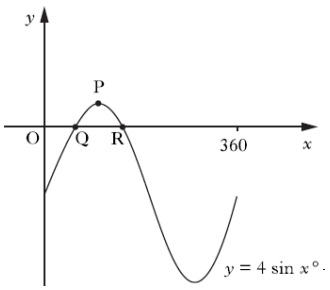
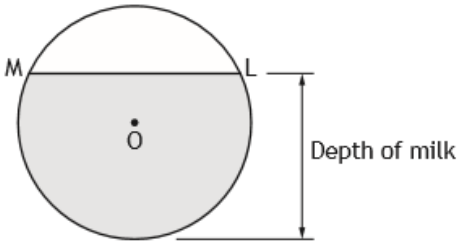
		My Working
11	Evaluate 14.2 + 8.3 x 40	
12	Find the equation of the straight line passing through the points $(2,-3)\ and\ (2,9)$	
13	Simplify $\frac{\sqrt{12}}{\sqrt{60}}$	
14	Change the subject of the formula to b. $L = 3a - \sqrt{b}$	
15	The graph shows $y = 5sinx - 4$. Find P and Q 	

		My Working
16	Solve to one decimal place $2x^2 + 4x - 9 = 0$	
17	Factorise $2x^2 + 7x - 15$	
18	John paid £297.50 for a laptop in a sale. The discount in the sale was 15%. Calculate the original price.	
19	 LM = 1.2m Radius = 1.8m Find the depth of milk	
20	Find the roots of the equation $y = x^2 - 2x - 15$	

100 Exam Questions

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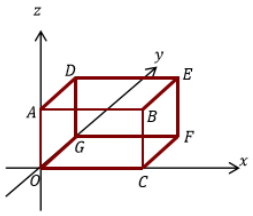
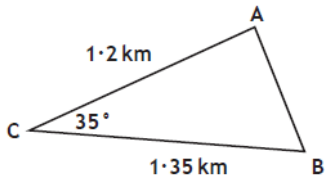
		My Working
21	E has coordinates $(5, 3, 1)$ Find the shortest distance between D and C 	
22	Find the equation of a straight line through $(2, -5)$ and parallel to $y = 3x - 5$	
23	Simplify $x^{\frac{1}{2}}\left(x^{\frac{1}{4}} + 3\right)$	
24	Solve $x - 3(x - 7) = 9$	
25	Sketch the graph of $y = 4cos2x$ for $0 \leq x \leq 360$	

		My Working
26	Find the volume of a sphere with radius 9m, giving your answer to two significant figures	
27	Remove the brackets and simplify $(2x+2)^2 - 2(x^2-2)$	
28	John paid £20,000 for a motorbike but it depreciated 5.5% each year for 7 years. What was its value after 7 years?	
29	 Find length AB	
30	Prove $sin^3x + sinxcos^2x = sinx$	

100 Exam Questions

Mark = /10

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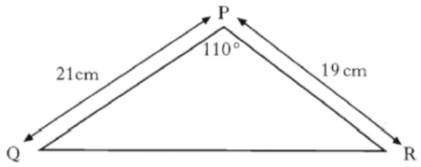
		My Working
31	Evaluate without a calculator: $\frac{2.1+3.2\times 5}{2^3}$	
32	Does the point $(-2,4)$ lie on the line $y=3x+10$? Explain your answer.	
33	Simplify $\sqrt{40}+4\sqrt{10}+\sqrt{90}$	
34	Simplify $(x-5)(3x-2)$	
35	Sketch the graph of $y=3\sin(0.5x)$ for $0\leq x\leq 360$	

		My Working
36	Solve $3x^2 + 3x - 7 = 0$ giving your answer correct to 1 decimal place	
37	Factorise $6x^2 - 24x - 30$	
38	In a sale, a book now cost £36. What was it worth before a 20% discount?	
39	Find the area of the triangle 	
40	Sketch $y = (x + 2)(x - 3)$ Label the intercepts and turning point	

100 Exam Questions

Mark = /10

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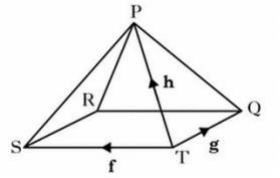
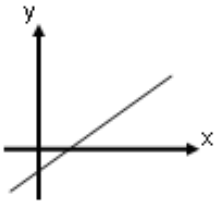
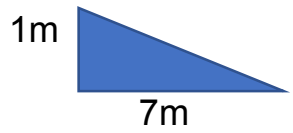
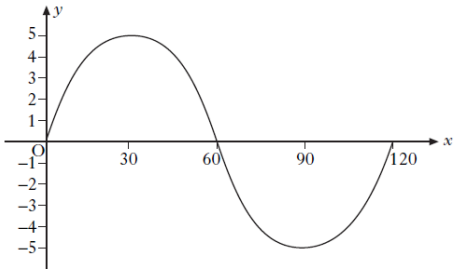
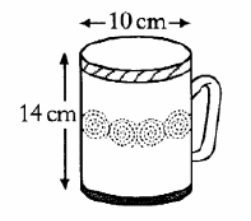
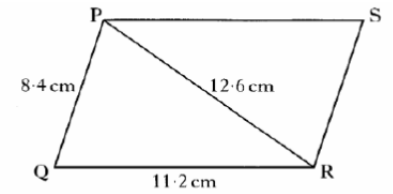
		My Working
41	Express $\overrightarrow{RP}$ in terms of $f, g \text{ and } h$ 	
42	 Chose the correct equation for the above graph a. $y = 2x + 1$ b. $y = -2x + 1$ c. $y = 2x - 1$ d. $y = 2x^2 - 1$	
43	Find the longest side of this right-angled triangle leaving your answer as a surd. 	
44	Solve $11 - 2(1 + 3x) < 39$	
45	Solve $2tanx + 5 = -4$ for $0° < x < 180°$	

		My Working
46	The standard deviation of 1, 2, 2, 2, 8 is $\sqrt{a}$ Find a	
47	Multiply out the brackets and simplify $(3x + 2)(x^2 - 4x + 3)$	
48	The population of the UK is 64.1 million. If it increased by 3% for the next 7 years, what would it be?	
49	The square below has side length y. If the diagonal is 6m. Find the exact length y 	
50	Show that $\frac{1 - cos^2 a}{cos^2 a} = tan^2 a$	

100 Exam Questions

Mark = /10

		My Working
51	Evaluate $\frac{5}{12} \times 2\frac{2}{9}$ Give the answer in its simplest form	
52	A straight line has gradient 4 and it passes through the points $(2,4)$ and $(1,a)$ Find the value of a	
53	Evaluate $2^0 + 3^{-1}$	
54	Change the subject of the formula to u $v^2 = u^2 + 2as$	
55	What is the equation of the graph below? 	

		My Working
56	Calculate the capacity of the cylindrical mug below 	
57	Factorise $(100x^2 - 500x - 2400)$	
58	The restaurant bill included 8% tax. If the bill was £324, what was the bill **before** tax?	
59	Calculate angle PQR 	
60	Write down the turning point and the equation of the axis of symmetry $y = (x - 3)^2 + 4$	

100 Exam Questions

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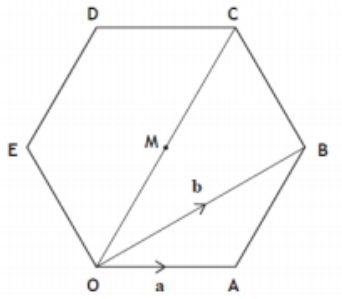
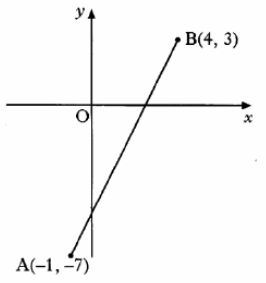
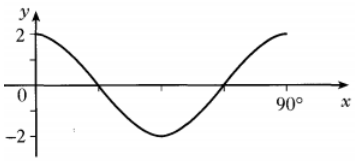
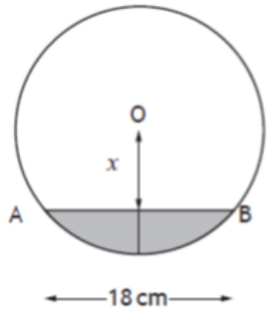
		My Working
61	Express $\overrightarrow{AB}$ in terms of a & b Express $\overrightarrow{OC}$ in terms of a & b 	
62	Find the equation of this line 	
63	Find $27^{\frac{2}{3}}$	
64	Solve $2x - 1 = \frac{x-4}{3}$	
65	What is the equation of the graph below 	

		My Working
66	Show that the s.d. of 1,1,1,2,5 is $\sqrt{3}$ and write down the s.d. of 101,101,101,102,105	
67	Multiply out and simplify $2(x^2 - 4x + 3) - x(x - 3)$	
68	Rob normally cycles a total distance of 56 miles per week. He increases his distance by 15% each week for the next three weeks. How many miles will he cycle in the third week?	
69	Depth of water in the cylindrical tank is 5m. Calculate the radius 	
70	Show that $\frac{tanx}{sinx} = \frac{1}{cosx}$	

100 Exam Questions

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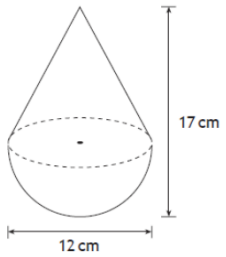
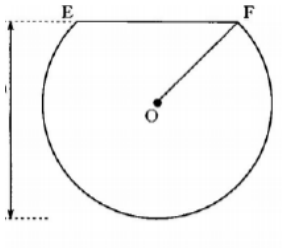
		My Working
71	Without using a calculator find $17.5\% \; of \; £90$	
72	For the straight-line equation $y = mx + c$ When $m > 0$ and $c < 0$ sketch a possible graph	
73	Simplify $\frac{6xy^3}{8x^4y^2}$	
74	Write as a single fraction $\frac{2}{x} + \frac{4}{x-2}$	
75	Solve the equation $11cos\, x° - 2 = 3$ for $(0 \leq x \leq 360°)$	

		My Working
76	Find volume to 2 s.f.  	
77	Factorise $16x^2 - 1$	
78	A 900g box has 20% extra washing powder. How much washing powder was in a standard size box?	
79	EF = 18 m OF = radius = 15 m Find h **h**  	
80	Describe the nature of the roots $y = x^2 - 3x + 3$	

100 Exam Questions

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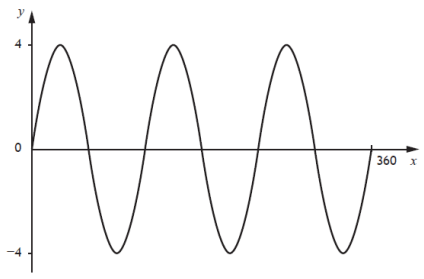
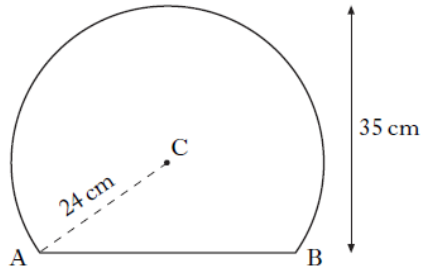
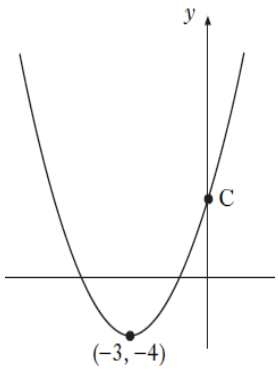
		My Working
81	Evaluate $3\frac{2}{5} - 2\frac{1}{3}$	
82	Find the gradient and y-intercept for the straight line: $3x - 17 = 15y$	
83	Express the below with a rational denominator in its simplest form $\frac{8}{\sqrt{8}}$	
84	Change the subject of the formula to R $P = R^3b - 5$	
85	State the equation of the graph below 	

		My Working
86	Make two valid comparisons for the two maths scores: Class A: Mean = 65%, s.d. = 12% Class B: Mean = 59%, s.d. = 10%	
87	Factorise $4a^2 - 60a - 136$	
88	A new car cost £25000. Its value was expected to decrease every year by 20%. Find its expected value after 7 years.	
89	Find the length AB 	
90	Below is a graph of $y = (x - a)^2 + b$ Find coordinates of c 	

N5 Self Check Ten

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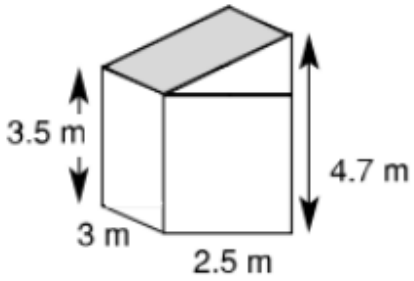
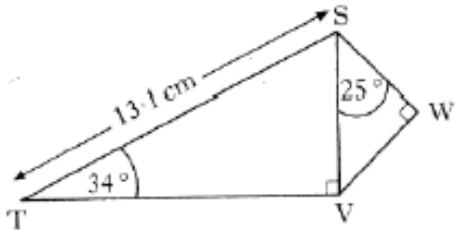
		My Working
91	Find $\|u\|$, the magnitude of $u = \begin{bmatrix} 6 \\ -13 \\ 18 \end{bmatrix}$	
92	Find the equation of a straight line between $(-7, 4)$ and $(-3, 5)$	
93	Express in its simplest form $y^8 \times (y^3)^{-2}$	
94	Solve for y $\frac{2(y-3)}{4} = \frac{y+5}{3}$	
95	Solve algebraically the equation $\sqrt{3} sin\, x° - 1 = 0$ for $0 \leq x \leq 360$	

		My Working
96	Find the total volume of the shape below.  	
97	Multiply out and simplify $(y-2)^3$	
98	I bought a new racing bike for £1500. This included VAT at 20%. What was the cost before VAT was added?	
99	Find the length SW  	
100	Express $x^2-14x+44$ in the form $(x-a)^2+b$	

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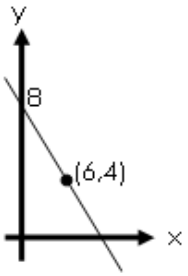
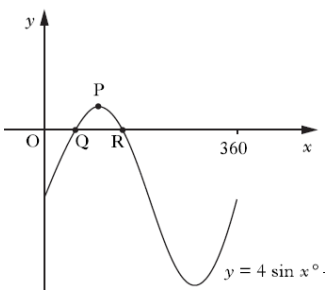
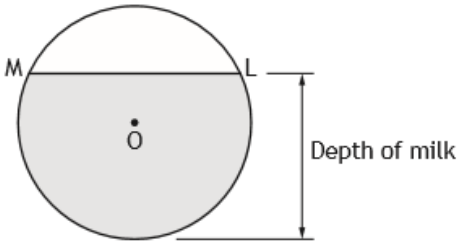
Answers

		Answers
1	Evaluate $6\frac{1}{5} - 2\frac{1}{3}$	$3\frac{13}{15}$
2	Find the equation of the line 	$y = -\frac{2}{3}x + 8$
3	Express $a^2(2a^{\frac{-1}{2}} + a)$ in its simplest form	$2a^{\frac{3}{2}} + a^3$
4	Solve $x - 2(x - 1) = 8$	$x = -6$
5	Solve $4sinx = 2$ for $0° < x < 360°$	$x = 30°,\ 150°$

		Answers
6	Find the standard deviation for 3, 8, 14, 20 Give your answer to 3 significant figures	s.d. = 7.37 (3 s.f.)
7	Factorise fully $2x^2 - 32$	$2(x+4)(x-4)$
8	A house is bought for £74,000, increases in value 4.5% every year for 3 years. What is its new value?	New Value = £84,446.29
9	A triangle has sides 83cm, 79cm and 19cm. Is it right angled?	$83^2 = 6889$ $19^2 + 79^2 = 6602$ Since $83^2 \neq 19^2 + 79^2$ then by the Converse of Pythagoras the triangle is **not** right-angled.
10	Find the roots of the equation $y = x^2 - x - 6$	$x = 3, x = -2$

Answers

		Answers
11	Evaluate 14.2 + 8.3 x 40	346.2
12	Find the equation of the straight line passing through the points $(2, -3)\ and\ (2, 9)$	$x = 2$
13	Simplify $\frac{\sqrt{12}}{\sqrt{60}}$	$\frac{1}{\sqrt{5}}$
14	Change the subject of the formula to b. $L = 3a - \sqrt{b}$	$b = (3a - L)^2$
15	The graph shows $y = 5sinx - 4$. Find P and Q 	$Q(53.1°, 0)\quad P(90°, 1)$

		Answers
16	Solve to one decimal place $2x^2 + 4x - 9 = 0$	$x = 1.3 \quad or \quad x = -3.3 \ (1\ d.p.)$
17	Factorise $2x^2 + 7x - 15$	$(2x - 3)(x + 5)$
18	John paid £297.50 for a laptop in a sale. The discount in the sale was 15%. Calculate the original price.	Original Price = £350
19	 LM = 1.2m Radius = 1.8m Find the depth of milk	Depth = 2.897 m
20	Find the roots of the equation $y = x^2 - 2x - 15$	$x = 5, \quad x = -3$

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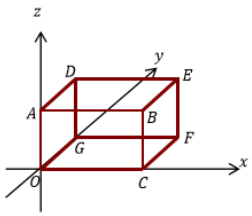
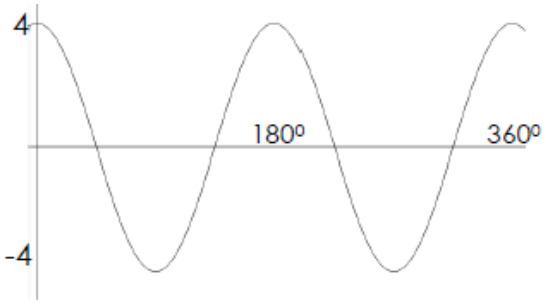
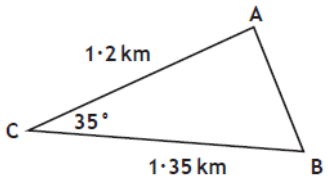
Answers

		Answers
21	E has coordinates $(5, 3, 1)$ Find the shortest distance between D and C 	$\sqrt{35}$
22	Find the equation of a straight line through $(2, -5)$ and parallel to $y = 3x - 5$	$y = 3x - 11$
23	Simplify $x^{\frac{1}{2}}\left(x^{\frac{1}{4}} + 3\right)$	$x^{\frac{3}{4}} + 3x^{\frac{1}{2}}$
24	Solve $x - 3(x - 7) = 9$	$x = 6$
25	Sketch the graph of $y = 4cos2x$ for $0 \leq x \leq 360$	

		Answers
26	Find the volume of a sphere with radius 9m, giving your answer to two significant figures	$V = 3100m^3\ (2\ s.f.)$
27	Remove the brackets and simplify $(2x+2)^2 - 2(x^2-2)$	$2x^2 + 8x + 8$
28	John paid £20,000 for a motorbike but it depreciated 5.5% each year for 7 years. What was its value after 7 years?	Value = £13,460.24
29	 Find length AB	AB = 0.78 km
30	Prove $sin^3x + sinxcos^2x = sinx$	$sinx(sin^2x + cos^2x) = sinx$ $sinx(1) = sinx$ $sinx = sinx$

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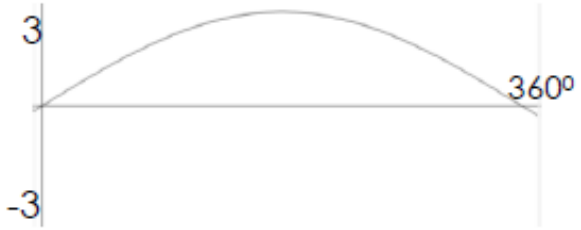
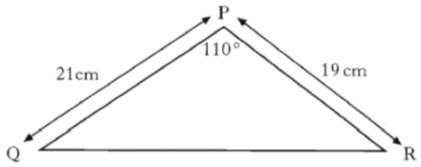
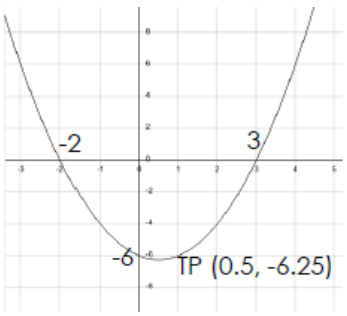
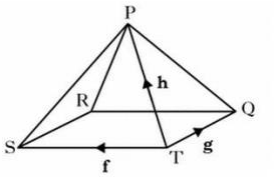
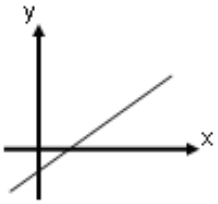
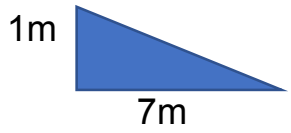
Answers

		Answers
31	Evaluate without a calculator: $\frac{2.1+3.2\times 5}{2^3}$	2.2625
32	Does the point $(-2,4)$ lie on the line $y=3x+10$? Explain your answer.	Point lies on the line since substituting $x=-2$ *and* $y=4$ *into* $y=3x+10$ gives: $4=3\times(-2)+10$ $4=4$
33	Simplify $\sqrt{40}+4\sqrt{10}+\sqrt{90}$	$9\sqrt{10}$
34	Simplify $(x-5)(3x-2)$	$3x^2-17x+10$
35	Sketch the graph of $y=3\sin(0.5x)$ for $0\leq x\leq 360$	

		Answers
36	Solve $3x^2 + 3x - 7 = 0$ giving your answer correct to 1 decimal place	$x = 1.1 \; or \; -2.1$
37	Factorise $6x^2 - 24x - 30$	$6(x-5)(x+1)$
38	In a sale, a book now cost £36. What was it worth before a 20% discount?	£45
39	Find the area of the triangle 	Area = $187.45cm^2$
40	Sketch $y = (x+2)(x-3)$ Label the intercepts and turning point	

Answers

		Answers
41	Express $\overrightarrow{RP}$ in terms of $f, g \text{ and } h$ 	$\overrightarrow{RP} = -f - g + h$
42	 Chose the correct equation for the above graph a. $y = 2x + 1$ b. $y = -2x + 1$ c. $y = 2x - 1$ d. $y = 2x^2 - 1$	$y = 2x - 1$
43	Find the longest side of this right-angled triangle leaving your answer as a surd. 	$5\sqrt{2}\,m$
44	Solve $11 - 2(1 + 3x) < 39$	$x > -5$
45	Solve $2tanx + 5 = -4$ for $0° < x < 180°$	$x = 102.5°, 282.5°$

		Answers
46	The standard deviation of 1, 2, 2, 2, 8 is $\sqrt{a}$ Find a	$a = 8$
47	Multiply out the brackets and simplify $(3x + 2)(x^2 - 4x + 3)$	$3x^3 - 10x^2 + x + 6$
48	The population of the UK is 64.1 million. If it increased by 3% for the next 7 years, what would it be?	78.8 million (3 s.f.)
49	The square below has side length y. If the diagonal is 6m. Find the exact length y 	$y = 3\sqrt{2}m$
50	Show that $\frac{1 - cos^2 a}{cos^2 a} = tan^2 a$	$Use\ sin^2 a + cos^2 a = 1\ and\ tanx = \frac{sinx}{cosx}$ to prove LHS = RHS

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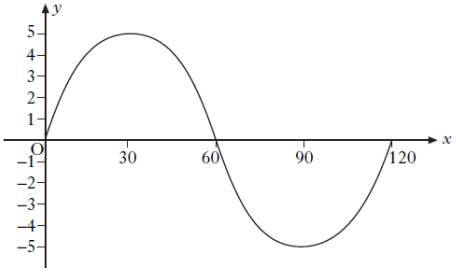
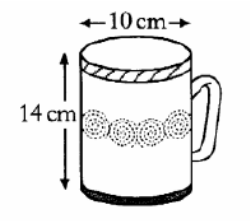
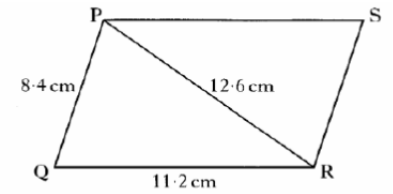
Answers

		Answers
51	Evaluate $\frac{5}{12} \times 2\frac{2}{9}$ Give the answer in its simplest form	$\frac{25}{27}$
52	A straight line has gradient 4 and it passes through the points $(2,4)$ and $(1,a)$ Find the value of a	$a = 0$
53	Evaluate $2^0 + 3^{-1}$	$1\frac{1}{3}$
54	Change the subject of the formula to u $v^2 = u^2 + 2as$	$u = \sqrt{v^2 - 2as}$
55	What is the equation of the graph below? 	$y = 5sin3x$

		Answers
56	Calculate the capacity of the cylindrical mug below 	$V = 1099cm^3$
57	Factorise $(100x^2 - 500x - 2400)$	$100(x-8)(x+3)$
58	The restaurant bill included 8% tax. If the bill was £324, what was the bill **before** tax?	£300
59	Calculate angle PQR 	Angle PQR $= 78.6°$
60	Write down the turning point and the equation of the axis of symmetry $y = (x-3)^2 + 4$	$T.P. = (3, 4)$ $x = 3$

Step-by-step worked solutions in the N5 Maths Study Pack

Answers

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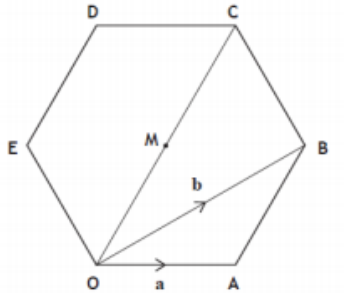
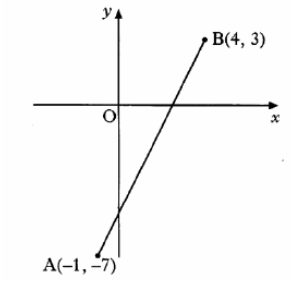
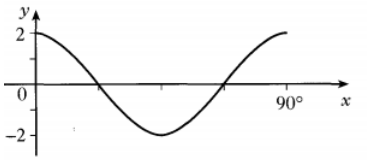
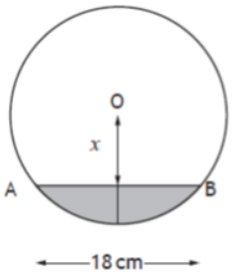
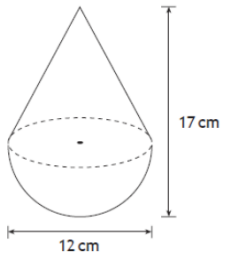
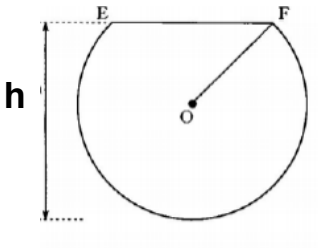
		Answers
61	Express $\overrightarrow{AB}$ in terms of a & b Express $\overrightarrow{OC}$ in terms of a & b 	$\overrightarrow{AB} = -a + b$ $\overrightarrow{OC} = 2(b - a)$
62	Find the equation of this line 	$y = 2x - 5$
63	Find $27^{\frac{2}{3}}$	$27^{\frac{2}{3}} = 9$
64	Solve $2x - 1 = \frac{x - 4}{3}$	$x = -\frac{1}{5}$
65	What is the equation of the graph below 	$y = 2Cos4x$

		Answers
66	Show that the s.d. of 1,1,1,2,5 is $\sqrt{3}$ and write down the s.d. of 101,101,101,102,105	First part proof Second part $s.d. = same = \sqrt{3}$
67	Multiply out and simplify $2(x^2 - 4x + 3) - x(x - 3)$	$x^2 - 5x + 6$
68	Rob normally cycles a total distance of 56 miles per week. He increases his distance by 15% each week for the next three weeks. How many miles will he cycle in the third week?	Miles in 3rd week = 85.169
69	Depth of water in the cylindrical tank is 5m Calculate the radius 	$r = 10.6m$
70	Show that $\frac{tanx}{sinx} = \frac{1}{cosx}$	$Use\ tanx = \frac{sinx}{cosx}$ to prove LHS = RHS

Answers

		Answers
71	Without using a calculator find $17.5\% \; of \; £90$	£15.75
72	For the straight-line equation $y = mx + c$ When $m > 0$ and $c < 0$ sketch a possible graph	
73	Simplify $\frac{6xy^3}{8x^4y^2}$	$\frac{3y}{4x^3}$
74	Write as a single fraction $\frac{2}{x} + \frac{4}{x-2}$	$\frac{6x-4}{x(x-2)}$
75	Solve the equation $11cos\, x° - 2 = 3$ for $(0 \leq x \leq 360°)$	$x = 62.96°, 297.04°$

		Answers
76	Find volume to 2 s.f.  	$V = 870\ cm^3$
77	Factorise $16x^2 - 1$	$(4x + 1)(4x - 1)$
78	A 900g box has 20% extra washing powder. How much washing powder was in a standard size box?	750g
79	EF = 18 m OF = radius = 15 m Find h  	$h = 27m$
70	Describe the nature of the roots $y = x^2 - 3x + 3$	There are no real roots

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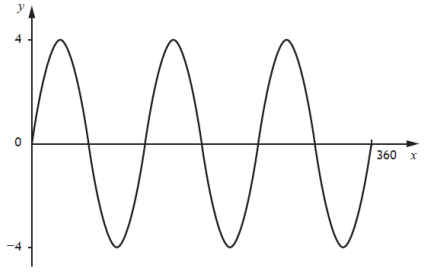
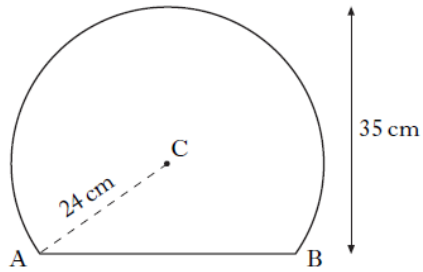
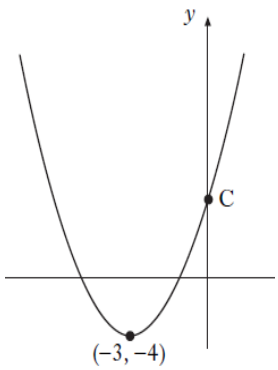
Answers

		Answers
81	Evaluate $3\frac{2}{5} - 2\frac{1}{3}$	$1\frac{1}{15}$
82	Find the gradient and y-intercept for the straight line: $3x - 17 = 15y$	$m = \frac{1}{5}, \quad c = -\frac{17}{15}$
83	Express the below with a rational denominator in its simplest form $\frac{8}{\sqrt{8}}$	$2\sqrt{2}$
84	Change the subject of the formula to R $P = R^3b - 5$	$R = \sqrt[3]{\frac{P+5}{b}}$
85	State the equation of the graph below 	$y = 4sin3x$

		Answers
86	Make two valid comparisons for the two maths scores: Class A: Mean = 65%, s.d. = 12% Class B: Mean = 59%, s.d. = 10%	• On average Class A have higher maths scores • Class A have less consistent marks
87	Factorise $4a^2 - 60a - 136$	$4(a - 17)(a + 2)$
88	A new car cost £25000. Its value was expected to decrease every year by 20%. Find its expected value after 7 years.	Value = £5248.88
89	Find the length AB 	$AB = 42.66\ cm$
90	Below is a graph of $y = (x - a)^2 + b$ Find coordinates of c 	$C\ (0, 5)$

Step-by-step worked solutions in the N5 Maths Study Pack

N5 Self Check Ten

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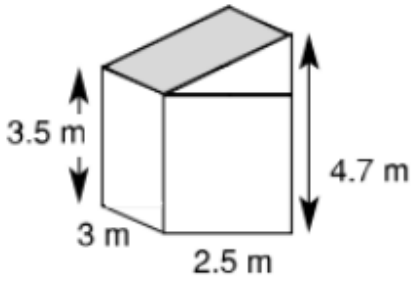
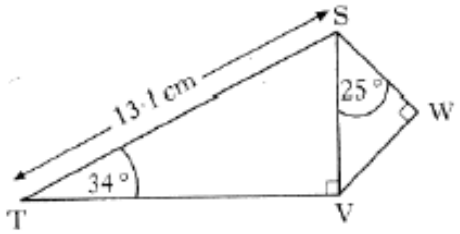
		Answers
91	Find $\|u\|$, the magnitude of $u = \begin{bmatrix} 6 \\ -13 \\ 18 \end{bmatrix}$	$\|u\| = 23$
92	Find the equation of a straight line between $(-7, 4)$ and $(-3, 5)$	$4y - x = 23$
93	Express in its simplest form $y^8 \times (y^3)^{-2}$	y^2
94	Solve for y $\frac{2(y-3)}{4} = \frac{y+5}{3}$	$y = 19$
95	Solve algebraically the equation $\sqrt{3} sin\, x° - 1 = 0$ for $0 \leq x \leq 360$	$x = 35.5°, 144.7°$

		Answers
96	Find the total volume of the shape below.  	$V = 30.75m^3$
97	Multiply out and simplify $(y-2)^3$	$y^3 - 6y^2 + 12y - 8$
98	I bought a new racing bike for £1500. This included VAT at 20%. What was the cost before VAT was added?	Cost = £1250
99	Find the length SW  	$SW = 6.6cm$
100	Express $x^2 - 14x + 44$ in the form $(x-a)^2 + b$	$\boldsymbol{(x-7)^2 - 5}$