

GCSE COACH GRADE 7 One page wonder mini-tests!



Question	KEY SKILL	A1	A2	A3	A4	A5
1	Surds					
2	Recurring decimals					
3	Complex indices					
4	Simultaneous Equations - both linear					
5	Simultaneous Equations - one quadratic					
6	Linear Graphs					
7	Quadratic Graphs					
8	Solving Quadratics					
9	Proof					
10	Non-linear sequences					
11	Compound interest					
12	Reverse percentages					
13	Standard form					
14	Expanding 3 brackets					
15	Circle Theorems					
16	Transforming graphs					
17	Trigonometry Revision					
18	Sector Area					
19	Bounds and Error intervals					
20	Algebraic Fractions					
21	Direct/Inverse Proportion					
22	Venn diagrams					
23	Probability					
24	Exact values of sin, cos, tan					
25	Similar Area/volume					
26	Re-arrange a formula with factorising					
27	Sine and cosine Rules					
28	Volumes of Cones and Spheres					
29	Cumulative Frequency and box plots					
30	Transformations					

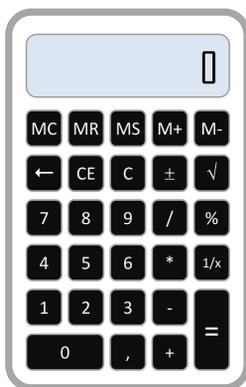
This revision booklet contains
5 tests for the new Maths GCSE 9-1.

Each test contains 30 questions on a double A4 page.

The questions are aimed at Higher
for those targeting grade 7.



Use the checklist to track your progress on each test. The
list of topics can also be used as a revision list.



You may use a calculator unless
the question states otherwise.



GCSE TARGET GRADE 7

One page wonder mini-test

Attempt 1 – Here we go!



Q1 Simplify a) $\sqrt{45}$ b) $\sqrt{150}$ c) $\frac{\sqrt{54}}{\sqrt{6}}$

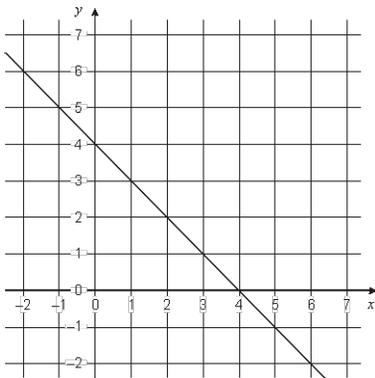
Q2 Convert this decimal into a fraction $0.\dot{1}\dot{5}$

Q3 Evaluate: $\left(\frac{144}{81}\right)^{-1/2}$

Q4 Solve: $5x + 2y = 20$
 $2x + 4y = 24$

Q5 Solve: $x^2 + y^2 = 16$
 $y = x$

Q6 Write down the equation of the line.
L2 is a line perpendicular to this one which passes through the point (0,-2). Write down the equation of L2



Q7 Complete a table of values then plot the graph for $y = x^2 + 3x - 18$

Use your graph to find the solutions to the inequality $x^2 + 3x - 18 < 0$

Q8 Complete the square for $x^2 + 8x + 12$

Q9 Prove that the sum of 3 consecutive even numbers will be a multiple of 6

Q10 Find the nth term of the sequence 4 7 12 19...
What is the 20th term?

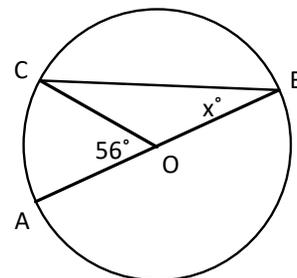
Q11 Bob invested £7000 for 2 years in a savings account. He was paid 3.5% per annum compound interest. How much money did he have in his savings account at the end of 2 years?

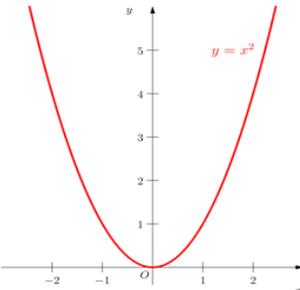
Q12 Barbara buys a dress for £82.20 
It had been reduced by 20% in a sale.
What was the price before the sale?

Q13 Work out $(3.2 \times 10^5) \times (4 \times 10^4)$
Give your answer in standard form.

Q14 Expand and simplify $(x + 1)(x + 3)(x + 5)$

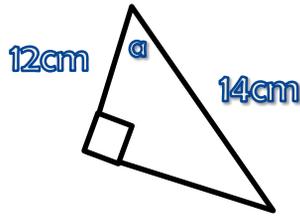
Q15 Calculate the size of angle x
Give reasons for your answer.



Q16  This is the the graph $y = f(x)$
sketch the graphs of $y = f(x) + 2$ and $y = f(x+2)$

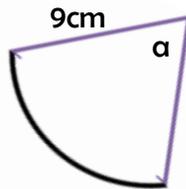
Q17

Calculate the size of angle α in this right-angled triangle.



Q18 The area of a sector with radius 9cm is 56.52cm^2

What is the size of angle α ?



Q19 A rectangular garden is 23.7 m by 12.3 m, correct to the nearest tenth of a metre. Calculate the upper and lower limits for the area.

Q20 Factorise and cancel down

$$\frac{x^2 + 11x + 30}{x^2 + 7x + 6}$$

Q21 s is directly proportional to the square of t .
If $s = 64$ when $t = 2$
Work out the value of s when $t = 4$

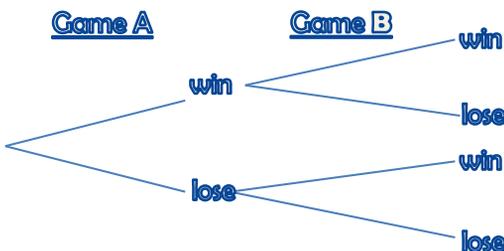
Q22 In a group of 24 people, 18 like oranges, 7 like apples and 4 like neither oranges nor apples Draw the venn diagram to show this. How many like both oranges and apples?



Anna is going to play 2 games. Game A & Game B
 $P(\text{winning game A}) = 1/3$
 $P(\text{winning game B}) = 1/5$

Q23

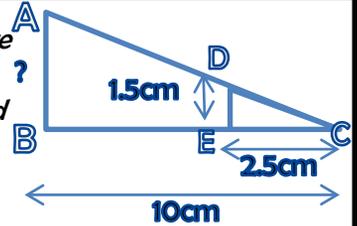
Complete the tree diagram to show this and find the $P(\text{winning at least 1 game})$



Q24 Without using a calculator give the exact value of $\sin\theta$ if $\theta = 30^\circ$

Q25 ABC and DEC are mathematically similar.
 $EC = 2.5\text{cm}$ $BC = 10\text{cm}$ and $DE = 1.5\text{cm}$.

Calculate the area of triangle ABC



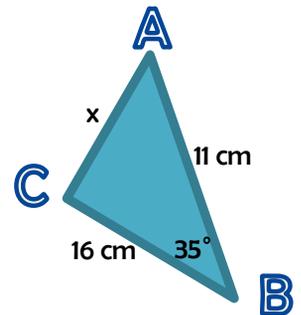
Q26

Re-arrange

$3h + d = hy$ to make h the subject

Q27

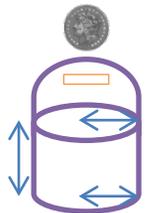
Find the length of x . Give your answer to 1 d.p.



Q28

A money box is made up of a hemisphere on top of a cylinder.

The height of the cylinder is 20cm. The radius of the cylinder and the hemisphere is 2 cm. Calculate the volume correct to 3 significant figures



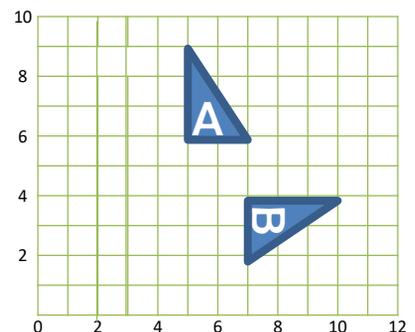
Q29

Draw a cumulative frequency graph for the number of pencils. Use it to find the median number

Pencils per box	Frequency
$0 \leq t \leq 6$	6
$6 < t \leq 12$	8
$12 < t \leq 18$	2
$18 < t \leq 24$	2
$24 < t \leq 30$	2

Q30

Describe the single transformation which maps shape A onto shape B



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Attempt 2 – more Q's!



Q1 Expand and simplify
 $(2 + \sqrt{5})(3 + \sqrt{5})$

Q2 Convert this decimal into a fraction **0.25**

Q3 Evaluate: $(\frac{125}{64})^{-1/3}$

Q4 Solve:
 $7x - 3y = 58$
 $5x + 3y = 62$

Q5 Solve:
 $y = 4 - x^2$
 $y = x^2$

Q6

a. Write down the equation of the line.

b. Will the point (-5, -20) be on the line?

c. Write the equation of a line which is parallel to this one.

Q7 Use a table of values to plot the graph
 $y = x^2 - 2x - 3$

x					
y					

Use your graph to find the solutions to the inequality $x^2 - 2x - 3 < 0$

Q8 solve giving your answers to 2d.p.
 $5x^2 + 8x + 2 = 0$

Q9 Prove that the sum of 2 consecutive integers will be an odd number

Q10 The nth term of a sequence is $2n^2 + n$
 Work out the 10th term of this sequence

Q11 Bea invested £400 for 3 years in a savings account. She was paid 3.5 % per annum compound interest. How much money did she have at the end of 3 years?

Q12 Linda buys a pair of trainers. She says, 'I bought this pair of trainers when there was 20% off the normal price. I paid £18 for them.'



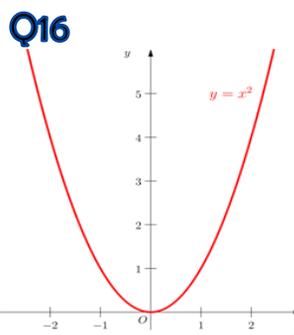
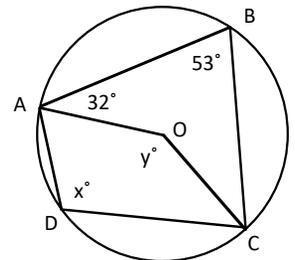
What was the **normal** price of the trainers?

Q13 Work out $(2.1 \times 10^5) \times (5 \times 10^2)$
 (2×10^{-2})

Give your answer in standard form.

Q14 Expand and simplify
 $(x + 1)(x - 2)(x + 3)$

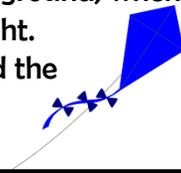
Q15
 Calculate the size of angles x and y
 give reasons for your answer



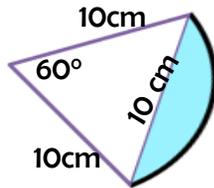
This is the the graph $y = f(x)$

sketch the graphs of $y = f(x) + 3$ and $y = f(2x)$

Q17 Dotty goes out and flies a kite. The string makes an angle of 62° to the ground. The kite is 38.5 metres vertically above a ground, when the string is pulled tight.
Draw a sketch and find the length of string.



Q18 work out the area of the shaded part of the sector.



(hint: you will need to find the height of the triangle first with pythagoras or use $1/2ab\sin C$)

Q19 The length of a rectangles is measured as 6cm to the nearest cm. The area is 24cm^2 to the nearest square centimetre. Calculate the upper and lower bound for the width.

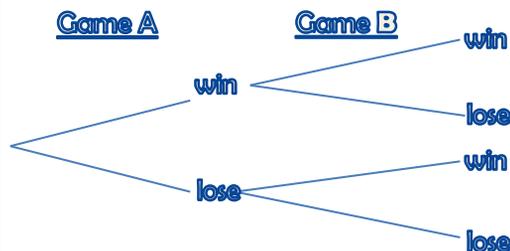
Q20 Solve the equation : $\frac{1}{2x-3} = \frac{3}{3x-2}$

Q21 y is directly proportional to x, and $y = 8$ when $x = 5$. Find a formula giving y in terms of x. What is y when $x = 14$?

Q22 35 people were asked if they like Rap, Rock or Pop . 4 liked all 3; 3 liked only rock and pop; 6 liked rap and pop; 10 liked only pop; 5 liked only rock; 3 liked only rap; 8 liked exactly two of the three types.
Draw a venn diagram to show this

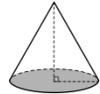
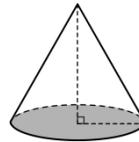


Evie is going to play 2 games. Game A & Game B
 $P(\text{winning game A}) = 0.6$
 $P(\text{winning game B}) = 0.2$
 Complete the tree diagram to show this and find the $P(\text{winning at least one game})$



Q24 Without using a calculator give the exact value of $\cos \Theta$ if $\Theta = 30^\circ$

Q25 A cone has base area of 12 cm^2 and a volume of 40 cm^3 .
Find the volume of a *similar* cone whose base area is 3 cm^2



Q26 Re-arrange $5x = xc + 3$ to make x the subject

Q27 Two boats **A** and **B** leave a pier at the same time. **A** sails on a bearing of 037° for 120Km



B sails on a bearing of 160° for 85 Km. What's the distance between the boats?



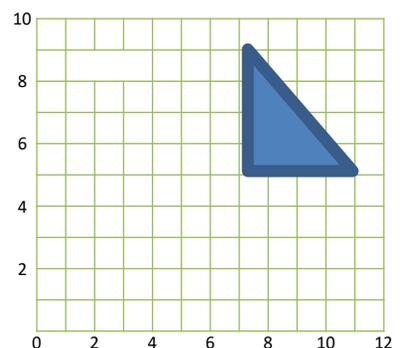
Q28 A spherical tennis ball has a volume of 200 cm^3 . Calculate the radius of the ball. Give your answer correct to 3 significant figures



Q29 Draw a box plot to show this data

Minimum mark	11
Lower quartile	32
Interquartile range	35
Median mark	43
Range	65

Q30 Enlarge the shape using a scale factor of $1/2$ from the point (1,3)



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Attempt 3 – Getting better?



Q1 Expand and simplify

$$(4 - \sqrt{2})(3 + \sqrt{2})$$

Q2 Convert this decimal into a fraction

0.39

Q3 Evaluate: $\left(\frac{144}{4}\right)^{-1/2}$

Q4 Solve:
 $4x + 2y = 24$
 $3x - 3y = 9$

Q5 Solve: $x^2 - y^2 = 6$
 $x + y = 3$

Q6 What is the gradient of the straight line that passes between the points $(-2, 3)$ and $(7, 6)$

what is the length of the line between these 2 points?

what is the gradient of a line which is perpendicular to this one?

Q7 Use a table of values to plot the graph $y = 2x^2 - 4x - 6$

x					
y					

Use your graph to find the solutions to the equation $2x^2 - 4x - 6 = 0$

Q8 Complete the square for:
 $x^2 - 4x - 2 = 0$

Q9

Prove that the sum of any 4 consecutive integers will be an even number

hint: call the first number 'n', the second will be..?

Q10

Find the nth term of the sequence

-3 0 5 12

Q11

Bella invests £5000 in an account for two years. The account pays 3% compound interest per annum. She has to pay 20% tax on the interest each year, taken from the account at the end of the year. How much money will Bella have after 2 years

Q12

In a sale, normal prices are reduced by 20%. The normal price of a dress is reduced by £30 Work out the normal price of the dress



Q13

Work out $(9.3 \times 10^{-5}) \div (3 \times 10^2)$
Give your answer in standard form

Q14

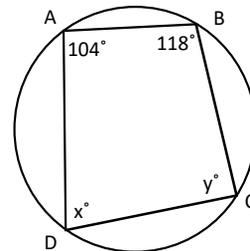
Expand and simplify

$$(x - 3)(x + 3)(x - 4)$$

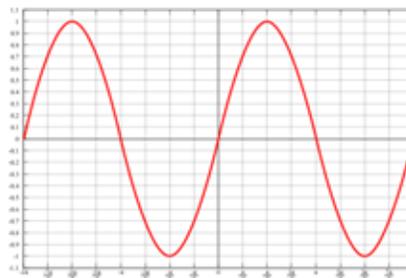
Q15

Calculate the size of the missing angles

give reasons for your answer



Q16

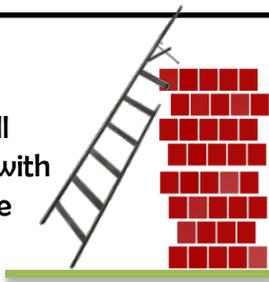


This is the graph $y = f(x)$

sketch the graph of $y = -f(x)$

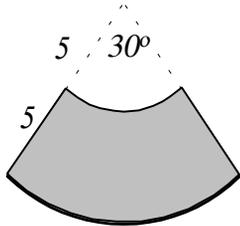
Q17

A ladder that is 6.1 metres long is placed against a wall and makes an angle of 32° with the wall. What is the distance from the base of the ladder to the wall.



Q18

Work out the shaded area



Q19

The measurements of a stamp are 11 mm by 5 mm, to the nearest mm. Write an error interval for the AREA of the stamp

Q20

Simplify: $\frac{a+b}{3ab} \times \frac{6a^2}{2a+2b}$

Q21

F is directly proportional to the square of G . If $F = 45$ when $G = 3$ Work out the value of G when $F = 4$

Q22

$\mathcal{E} = \{a, b, c, d, e, f, g, h\}$

$A = \{a, b, c\}$

$B = \{c, d, e, f\}$

By drawing a Venn diagram list the sets

(a) $A \cup B$ (b) $A \cup B'$

Q23

A bag contains red and blue sweets, there are x red sweets. There are 30 sweets in the bag.

Anna picks out 2 sweets and eats them. What's the probability that she picks out 2 red sweets?

Give your answer in terms of x

Q24

Without using a calculator give the exact value of $\sin \theta$ if $\theta = 45^\circ$

Q25



Shapes A and B are similar. If the area of A is 6cm^2 , what is the area of shape B?

Q26

Rearrange $h(v - 2) = sv$ to make v the subject

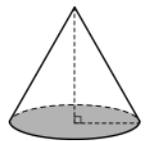
Q27

Jill goes on a walk. she walks 28 Km on a bearing of 070° and then she walks 32 Km on a bearing of 134° . How far from the starting point is she now?



Q28

The radius of the base of a cone is 5 cm. Its height is 18 cm. Calculate the volume of the cone. Give your answer in terms of π



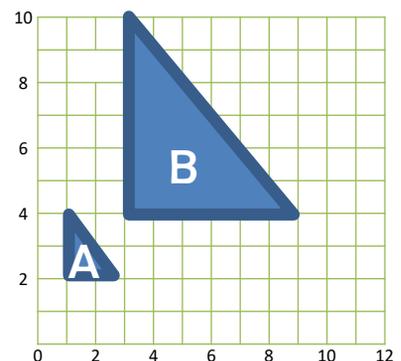
Q29

Draw a cumulative frequency graph for the time spent on homework. Use it to find the median time

Time, t , spent on homework (mins)	Freq.
$0 \leq t \leq 30$	6
$30 < t \leq 60$	14
$60 < t \leq 90$	21
$90 < t \leq 120$	9

Q30

Describe the single transformation which maps shape A onto shape B



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Attempt 4 – Go for it!



Q1 Expand and simplify
 $(5 - 2\sqrt{3})^2$.

Q2 Convert this decimal into a fraction $0.\dot{2}\dot{3}$

Q3 Evaluate: $125^{-2/3}$

Q4 Solve: $6x + 2y = 16$
 $5x + 5y = 10$

Q5 Solve: $x^2 + y^2 = 5$
 $y = x + 3$

Q6 The vertices of quadrilateral ABCD are
A (1, 4),
B (-1, 5),
C (-4, 4) and
D (-2, 2).

Calculate the gradient of lines

AB
BC
and CD

find the equation of line CD

Q7 Use a table of values to plot the graph
 $y = x^2 + 2x - 8$

x					
y					

Use your graph to find the solutions to the inequality $x^2 + 2x - 8 < 0$

Q8 The width of a classroom is 2m less than the length, and the area is 180 m^2 . find the length and width.

Prove that if you square 2 consecutive integers, the difference between the squares is equal to the sum of these 2 integers. **Q9**

Q10 A sequence begins 1 1 2 3 5 what is the name of this sequence? If the first term was x and the second y, write an expression for the 5th term

Q11 The value of a car depreciates by 15% each year. At the end of 2013 the value was £7230. Work out the value of the car in 2016

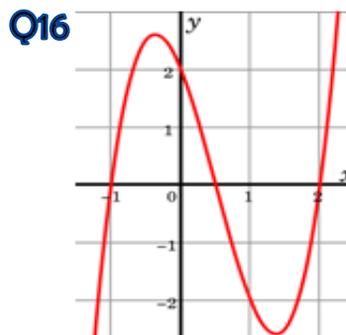
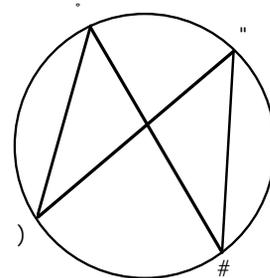
Q12 A watch is reduced by 12% in a sale. The sale price is £14.08. What was the original price?



Q13
a. Write 1.8×10^{-4} as an ordinary number.
b. Work out $(3 \times 10^4) \times (7 \times 10^6)$
Give your answer in standard form.

Q14 Expand and simplify
 $(x - 2)(x + 3)^2$

Q15 Calculate the size of the missing angles
give reasons for your answer

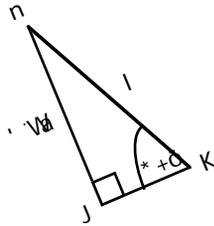


This is the graph $y = f(x)$

sketch the graph of $y = f(-x)$

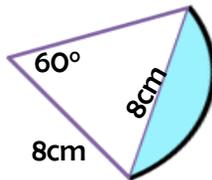
Q17

VWX is a right-angled triangle. Calculate length x.



Q18

work out the area of the shaded part of the sector.



Q19

The length of a rectangle is measured as 8cm to the nearest cm. The area is 16cm² to the nearest square centimetre. What is the error interval for the width.

Q20

Factorise and cancel down where possible $\frac{2x^2 - 5x + 3}{2x^2 - x - 3}$

Q21

The distance, D is directly proportional to the square of the time, t. When t = 60, D = 30 Calculate the value of t when D = 12 Give your answer correct to 3 significant figures.

Q22 $\mathcal{E} = \{ 1, 2, 3, 4, 5, 6 \}$,
 $A = \{ 1, 2, 3, 4 \}$,
 $B = \{ 3, 4, 5 \}$,
 $C = \{ 1 \}$.

Draw a Venn diagram and List the sets

(i) $A \cap B$ (ii) $A \cap C$

Q23

A box contains 3 red and 5 green toys. Rhiannon picked two toys one after the other (without replacing them). Draw a tree diagram to show all the possible combinations of toys that Rhiannon picked. What is the probability that she picks 2 red toys from the box?

Q24 Without using a calculator give the exact value of $\tan \theta$ if $\theta = 45^\circ$

Q25



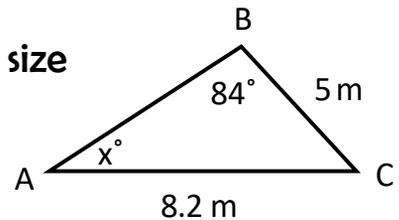
Shapes A and B are similar. If the volume of A is 100cm³, what is the volume of shape B?

Q26

Make x the subject of $4(x - 2) = y(2 - 3x)$

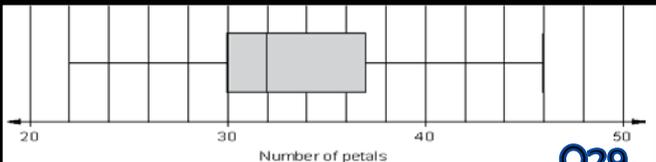
Q27

Calculate the size of angle x.



Q28

Find the volume of a fishbowl in the shape of a hemisphere with a diameter of 33cm.

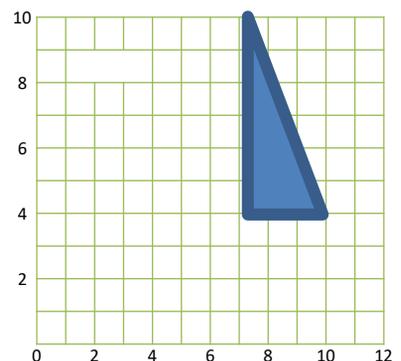


Q29

- (a) What is the median number of petals?
 (b) What's the inter-quartile range of n°. of petals?

Q30

Enlarge the shape using a scale factor of 1/3 from the point (1,1)



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Attempt 5 – Like a pro!



Q1 Rationalise the denominator: $\frac{6}{(5 - \sqrt{3})}$.

Q2 Convert this decimal into a fraction $0.1\dot{2}\dot{3}$

Q3 Evaluate:
 $9^0 + 8^{-2/3}$

Q4 Solve: $2x + 3y = 5$
 $7x + 4y = -2$

Q5 Solve: $x^2 + y = 24$
 $y = 2x$

Q6 Write down the equation of a line with gradient 3 which passes through the point (2,5)

Give the equations of a line which is perpendicular to this one

Q7 Plot the graph
 $y = x^2 - 2x - 15$

Use your graph to find the solutions to the inequality
 $x^2 - 2x - 15 < 0$

Q8 solve giving your answers to 2d.p.
 $3x^2 + 7x + 3 = 0$

A man is 39 years old and his son is 11 years old. Use algebra to work out how many years ago the product of their ages was 128

Q9

Q10 The nth term of a sequence is $n^2 + n + 1$
Work out the 10th term of this sequence

Q11 Jazz invested £2100 for x years in a savings account.
He was paid 4.5% per annum compound interest. At the end of the x years he had £2734.75 in the savings account.
Work out the value of x

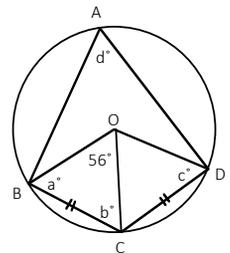
Q12 The value of a car is £6,500.
If the value depreciates by 15% per year, what was the value last year?



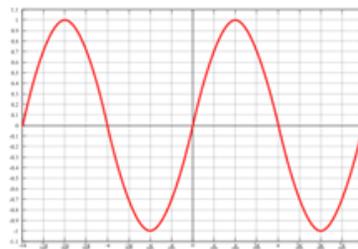
Q13
a. Write 2.901×10^{-5} as an ordinary number.
b. Work out $(2.2 \times 10^4) \div (1.1 \times 10^{-6})$
Give your answer in standard form

Q14 Expand and simplify:
 $(x - 4)^3$

Q15 Calculate the size of the missing angles
give reasons for your answer

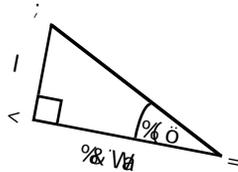


Q16 This is the the graph $y = \sin x$
sketch the graph of $y = \sin(x - 90)$



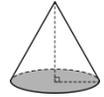
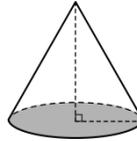
Q17

Calculate length x .

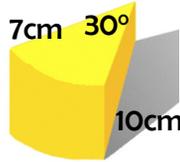


Q24 Without using a calculator give the exact value of $\sin \theta$ if $\theta = 90^\circ$

Q25 A cone has base area 35 cm^2 and volume 84 cm^3 . Find the base area of a similar cone whose volume is 10500 cm^3



Q18 A wedge of cheese is cut from a cylindrical block as shown. The sector has angle 30° and radius 7 cm . The height of the wedge is 10 cm . Work out the volume of cheese



Q26

Rearrange

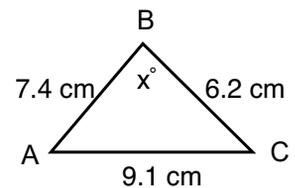
$$x = \frac{a - y}{y - z} \text{ to make } y \text{ the subject}$$

Q19

Kim measures a line, L , to one decimal place. Her result is 7.8 . Write down the error interval for her result.

Q27

Calculate the size of angle x .



Q20

Solve the equation :

$$1 + \frac{5}{x} + \frac{4}{x^2} = 0$$

Q21

Pressure P is inversely proportional to volume V . If $P = 200 \text{ N}$ when $V = 2.4 \text{ m}^3$, Find a formula giving P in terms of V . Find the pressure when the volume is 2 m^3

Q28

The volume of a sphere is 288 cm^3 . What are the radius & surface area of the sphere?



Q22

Out of 80 people, 49 play tennis; 49 play darts; 50 play rugby. 27 play tennis and darts; 29 play darts and rugby; 28 play tennis and rugby. 16 people play all 3. Everyone plays at least 1.

Draw the venn diagram to show this



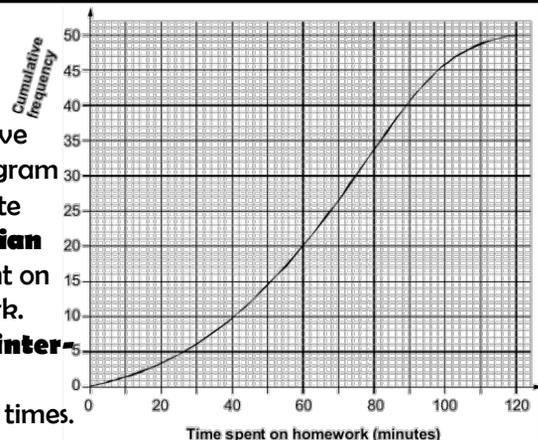
Q23

Jenny has a bag with 7 blue sweets and 3 red sweets. She picks a sweet at random from the bag, eats it and picks again at random. Draw a tree diagram to represent this & use it to calculate the probabilities that she picks

- 2 red sweets
- no red sweets
- 1 sweet of each colour

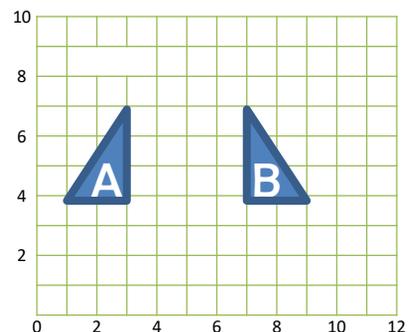
Q29

Use the Cumulative Freq. diagram to estimate the **median** time spent on homework. Find the **inter-quartile range** of times.



Q30

Describe the single transformation which maps shape A onto shape B



Blank for your revision notes

Q9

Q1

Q10

Q2

Q11

Q3

Q12

Q4

Q13

Q5

Q14

Q6

Q15

Q7

Q16

Q8

Q17

Q18

Q19

Q20

Q21

Q22

Q23

Q24

Q25

Q26

Q27

Q28

Q29

Q30