



## Formula List

For the equation  $ax^2 + bx + c = 0$   $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Curved surface area,  $A$ , of cylinder of radius  $r$ , height  $h$ .  $A = 2\pi rh$

Curved surface area,  $A$ , of cone of radius  $r$ , sloping edge  $l$ .  $A = \pi rl$

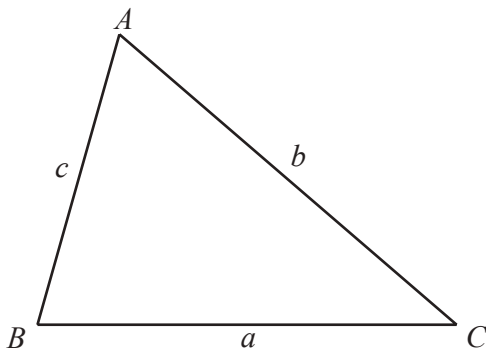
Curved surface area,  $A$ , of sphere of radius  $r$ .  $A = 4\pi r^2$

Volume,  $V$ , of pyramid, base area  $A$ , height  $h$ .  $V = \frac{1}{3}Ah$

Volume,  $V$ , of cylinder of radius  $r$ , height  $h$ .  $V = \pi r^2 h$

Volume,  $V$ , of cone of radius  $r$ , height  $h$ .  $V = \frac{1}{3}\pi r^2 h$

Volume,  $V$ , of sphere of radius  $r$ .  $V = \frac{4}{3}\pi r^3$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{Area} = \frac{1}{2}bc \sin A$$

Answer **all** the questions.

- 1 Write 84% as a fraction in its lowest terms.

..... [1]

- 2 Work out  $(1 - 0.8)^2$ .

..... [1]

- 3 Find the value of  $x^2 - x$  when  $x = -3$ .

..... [1]

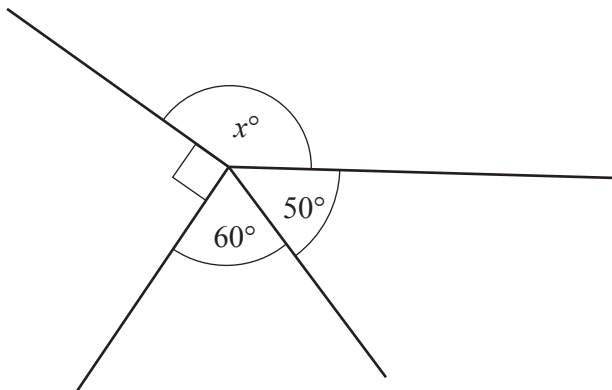
- 4 A quadrilateral has all sides equal and exactly two lines of symmetry.

Write down the mathematical name of this quadrilateral.

..... [1]

5

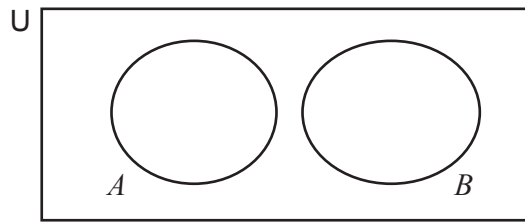
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Find the value of  $x$ .

$x =$  ..... [1]

- 6 On the Venn diagram, shade  $A \cup B$ .



[1]

- 7 Find the size of one interior angle of a regular polygon with 20 sides.

..... [3]

- 8 Find the value of  $|-4| + 4$ .

..... [1]

- 9 A van has length 9 m.  
It takes 1 second for the van to completely pass a gate of length 1 m.

Find the speed of the van.  
Give your answer in km/h.

..... km/h [2]

- 10** The faces of a die are numbered 1, 1, 2, 3, 3 and 4.  
When it is rolled it is equally likely to show any face.  
The die is rolled twice.

Find the probability that it shows an odd number both times.

..... [2]

- 11** Here are the first five terms of a sequence.

$$\frac{1}{4} \quad 1 \quad 4 \quad 16 \quad 64$$

- (a)** Find the next term.

..... [1]

- (b)** Find the  $n$ th term.

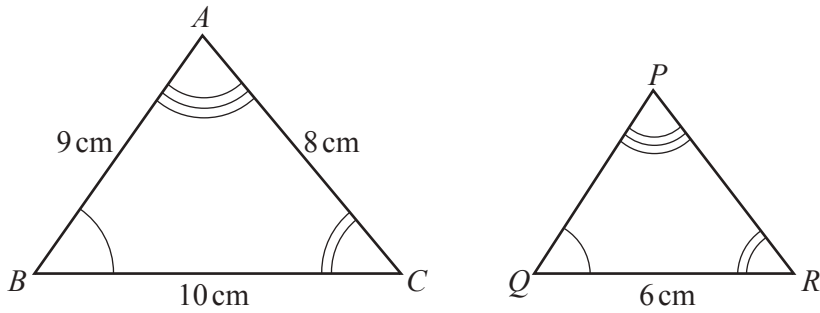
..... [2]

- 12** Factorise.

$$1 + a - c - ac$$

..... [2]

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The diagram shows two similar triangles,  $ABC$  and  $PQR$ .

(a) Find the length of  $PR$ .

$$PR = \dots\dots\dots \text{ cm [2]}$$

(b) The triangles are the cross-sections of mathematically similar prisms.  
The volume of the larger prism is  $500 \text{ cm}^3$ .

Find the volume of the smaller prism.

$$\dots\dots\dots \text{ cm}^3 \text{ [2]}$$

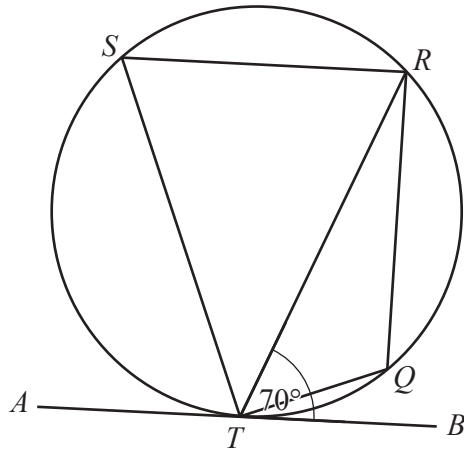
14

$$A = P(1+x)^3$$

Rearrange the formula to write  $x$  in terms of  $A$  and  $P$ .

$$x = \dots\dots\dots \text{ [3]}$$

15

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Points  $Q$ ,  $R$ ,  $S$  and  $T$  lie on the circle.  
 $AB$  is a tangent to the circle at  $T$ .  
 Angle  $RTB = 70^\circ$ .

Find angle  $RQT$ .

Angle  $RQT = \dots\dots\dots$  [2]

16  $p$  varies inversely as the square root of  $q$ .  
 When  $q = 9$ ,  $p = 12$ .

Find  $p$  when  $q = 16$ .

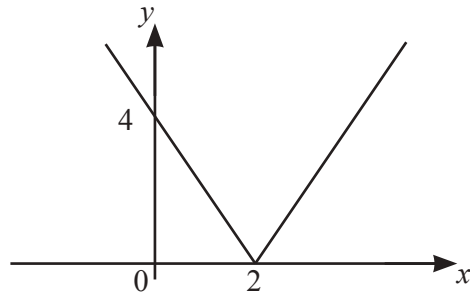
$p = \dots\dots\dots$  [3]

17 Simplify by rationalising the denominator.  $\frac{3}{2\sqrt{2}-1}$

$\dots\dots\dots$  [2]

Questions 18, 19 and 20 are printed on the next page.

18

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The diagram shows the graph of  $y = |ax + b|$ , where  $a > 0$ .

Find the value of  $a$  and the value of  $b$ .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots [2]$$

19 Write as a single fraction in its simplest form.

$$\frac{3}{x-2} - 2$$

$$\dots\dots\dots [2]$$

20  $2 \log p = 3 \log x - \log y$

Find  $p$  in terms of  $x$  and  $y$ .

$$p = \dots\dots\dots [3]$$

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