GCSE MATHEMATICS

S21-C300

With Calculator Assessment Resource D

Foundation Tier

Formula list

Area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

Curved surface area of a cone = πrl

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

Kinematics formulae

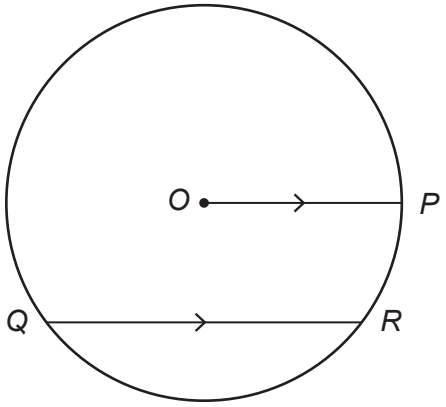
Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

1. *(a)* The diagram shows a circle with centre *O*.
P, *Q* and *R* are points on the circle.



tangent	radius
area	chord
diameter	circumference
parallel	perpendicular

Choose words from the box to complete these sentences.

(i) Line *OP* is a .....

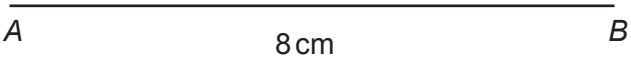
(ii) Line *QR* is a .....

(iii) Lines *OP* and *QR* are ..... . [2]

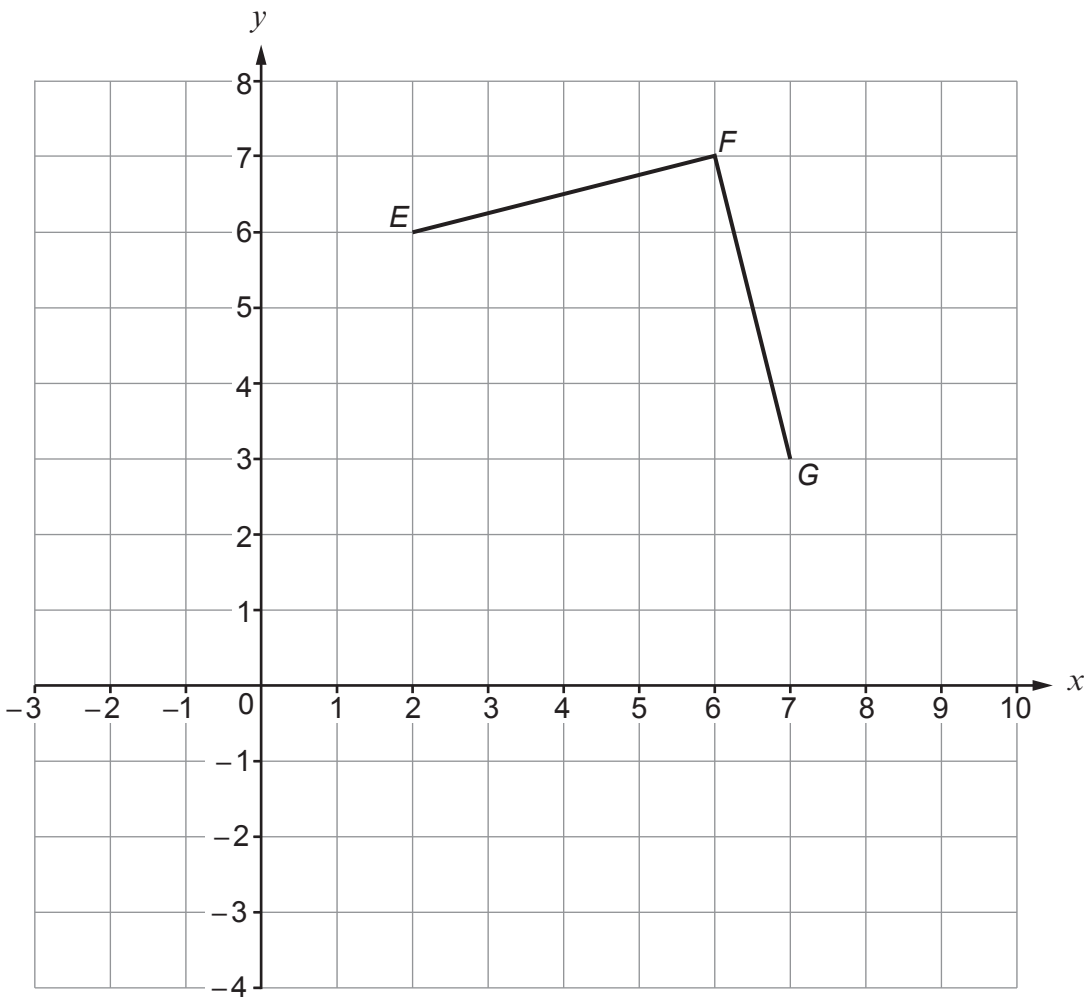
(b) *ABC* is a right-angled triangle in which:

- *AB* = 8 cm,
- angle *A* = 90°,
- *AC* = 6·5 cm.

Complete an accurate drawing of triangle *ABC*.
AB has been drawn for you. [2]



2. Two sides of a square *EFGH* are shown on the 1 cm grid below.



(a) Point *H* of the square is missing from the diagram.
Mark point *H* on the diagram.
Write down the coordinates of point *H*. [2]

(..... , ...)

(b) Point *J* is the reflection in the y-axis of point *E*.
Mark point *J* on the diagram.
Write down the coordinates of point *J*. [2]

(..... , ...)

3. *(a)* The diagram shows a rectangular wall.

Calculate the area of the wall.
Round your answer correct to the nearest 10 m^2. [3]

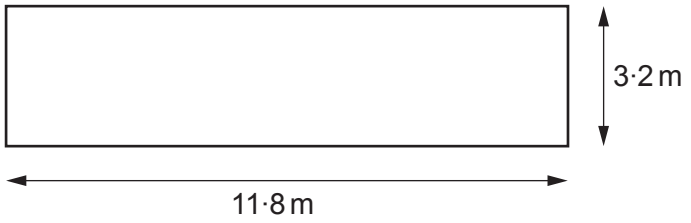


Diagram not drawn to scale

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(b) The area of a different wall is 110 m^2.
Liesel wants to paint the wall. She uses paint from tins that each cover 25 m^2.

She calculates 110 ÷ 25 = 4·4 and says,

"I need to buy 4 tins of paint."

Is Liesel correct?

Yes ☐ No ☐

Explain how you decide. [1]

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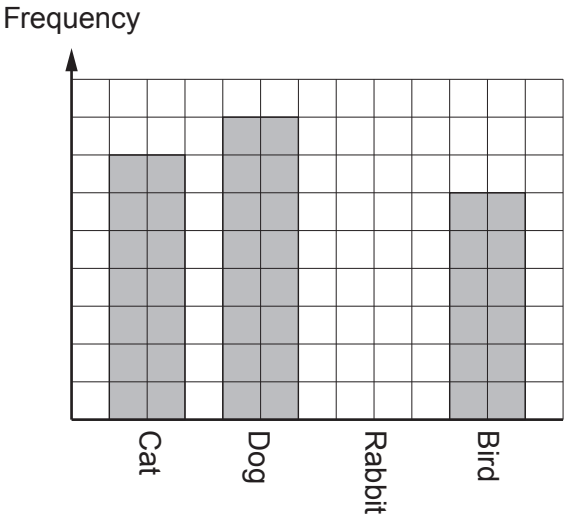
4. *(a)* The table and bar chart below show some information about the number of pets seen by a vet on Tuesday.

Type of pet	Frequency
Cat	14
Dog	.....
Rabbit	8
Bird	.....



(i) Using the information above, complete the table and draw the bar for rabbit. [3]

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(ii) Which is the modal type of pet? [1]

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(b) The table below shows the number of pets seen by the vet on Wednesday.

Type of pet	Frequency
Cat	10
Dog	17
Rabbit	9
Bird	12
Total	**48**

(i) The vet decides to show this information in a pie chart.

Calculate the angle used to show the cats. [2]

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(ii) A pet is chosen at random from the pets that were seen on Wednesday.

What is the probability that this pet is a dog? [1]

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5. In the diagram, triangle *ABC* is isosceles.

AC and *DE* are parallel, $B\hat{A}C = 72°$ and $A\hat{C}D = 37°$.

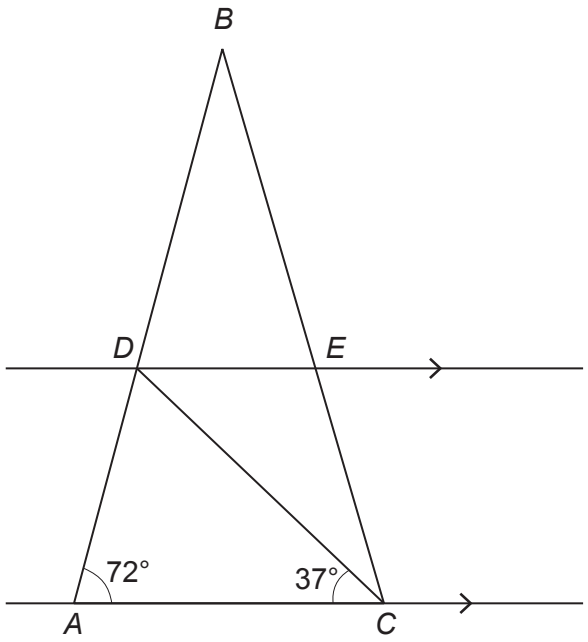

Diagram not drawn to scale

(a) Find the size of each of the following angles.

(i) $B\hat{D}E$ [1]

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(ii) $C\hat{D}E$ [1]

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(iii) $A\hat{B}C$ [2]

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(b) Write the mathematical name of quadrilateral *ACED*. [1]

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6. The shape below is made from two rectangles.
All the lengths are in cm.

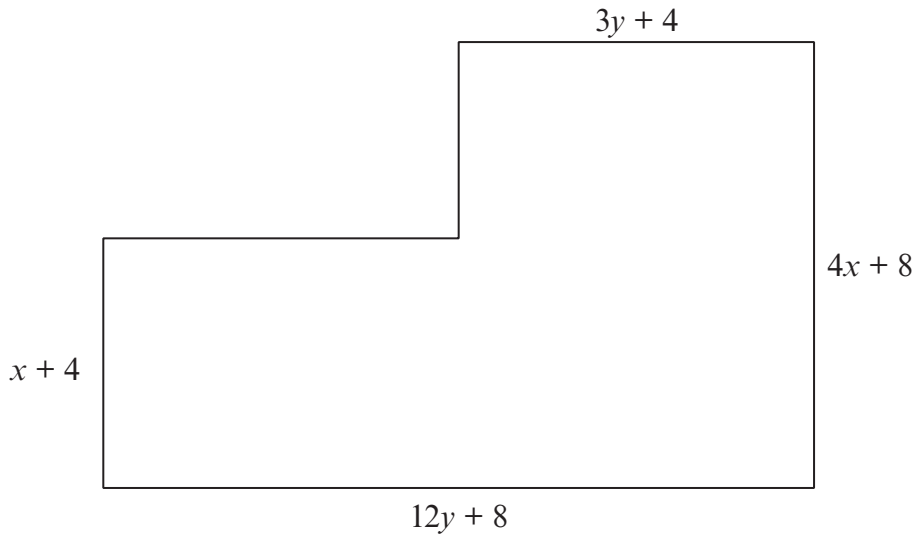

Diagram not drawn to scale

(a) Write an expression for the perimeter of the shape.
Simplify your expression. [3]

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(b) Use the highest possible number to complete the following sentence. [1]

'The expression for the perimeter is a multiple of ..... .'

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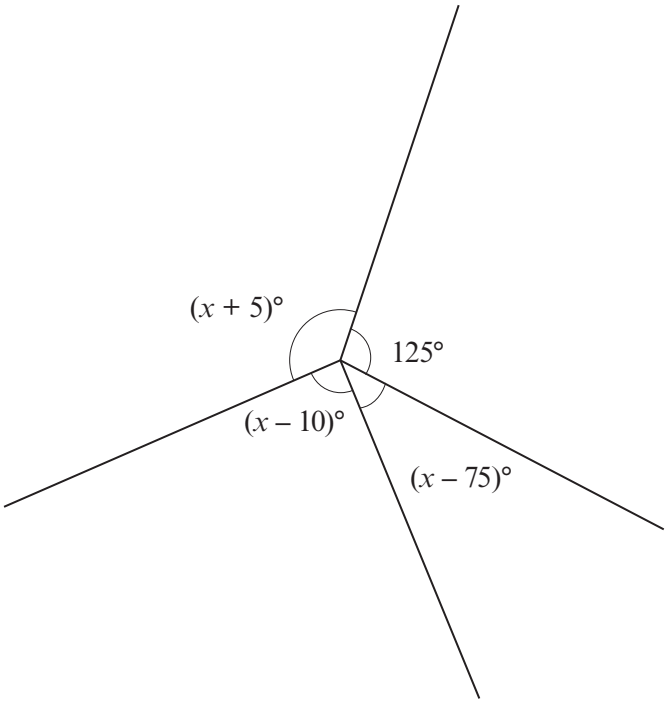

Diagram not drawn to scale

Write an equation in terms of x and solve it.
You must show all your working. [3]

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x = ...

8. Expand and simplify $(2x - 7)(3x - 8)$. [3]

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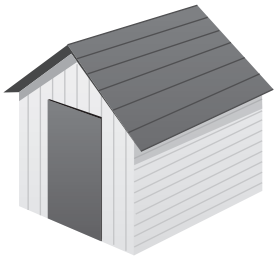
9. *(a)* Shireen has a new shed.



The walls of the shed are vertical.
The shed stands on horizontal ground.
The uniform cross-section has one line of symmetry.

The diagram below shows some of the measurements of the cross-section.

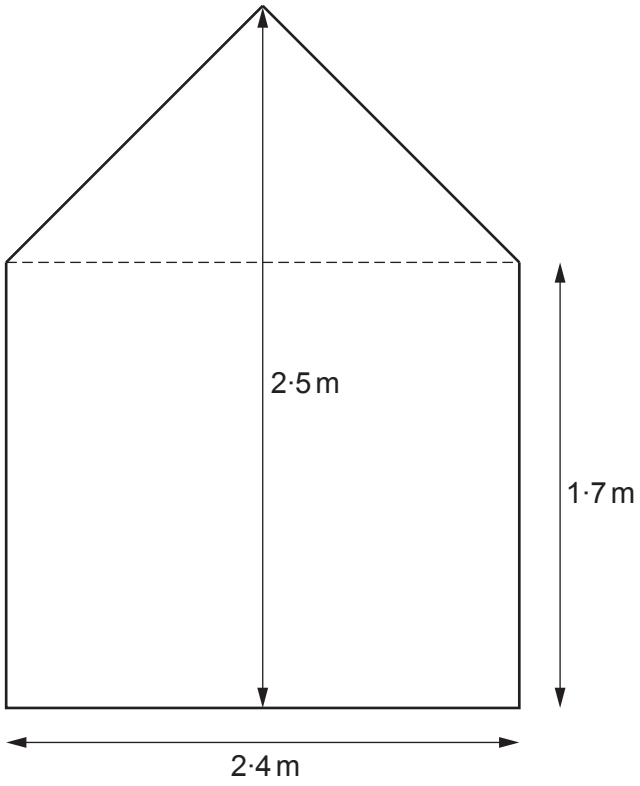


Diagram not drawn to scale

Calculate the size of the angle between the roof of the shed and the horizontal. [4]

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(b) Petra has a mathematically similar shed.

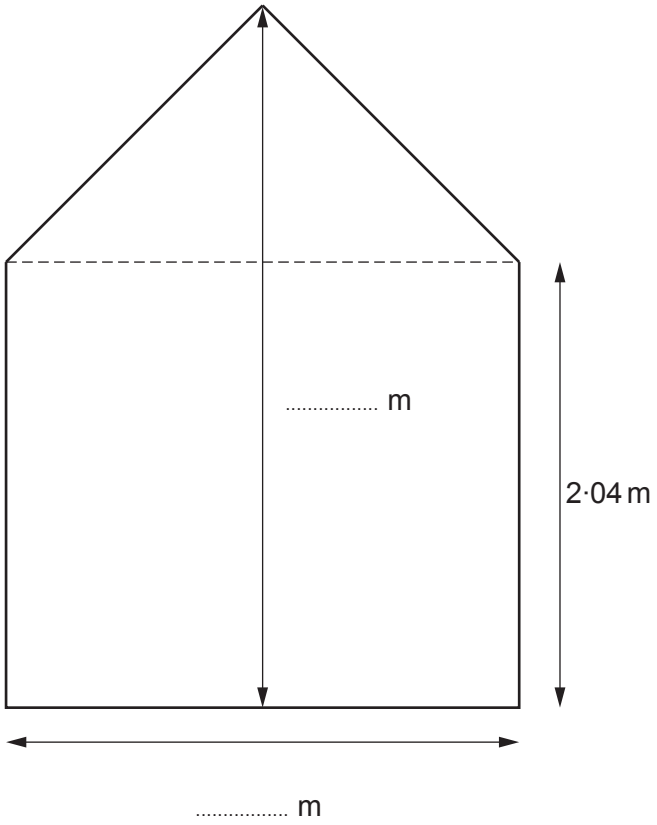

Diagram not drawn to scale

Calculate the two missing measurements on the diagram above.
You must show all your working. [3]

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