



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:

$$\text{Curved surface area of a cone} = \pi r l$$

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

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

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

Kinematics formulae

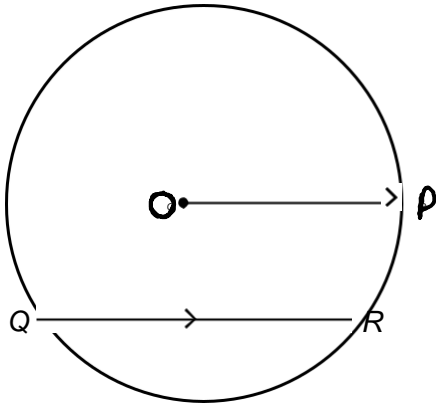
Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time taken:

$$v = u + at$$

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

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

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 Radius
 (ii) Line QR is a Chord
 (iii) Lines OP and QR are Parallel

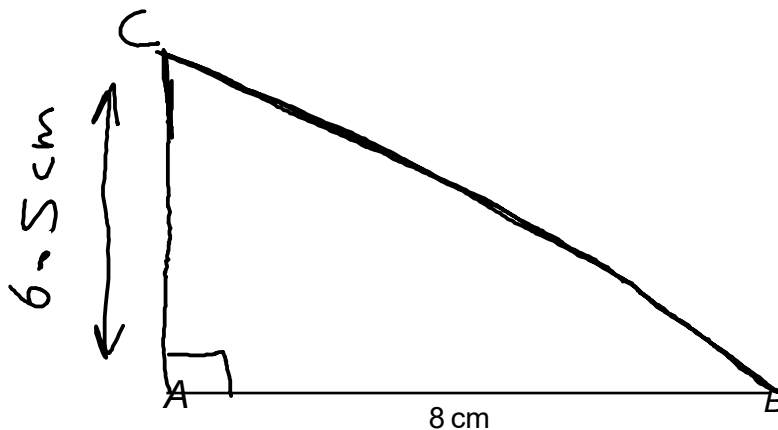
[2]

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

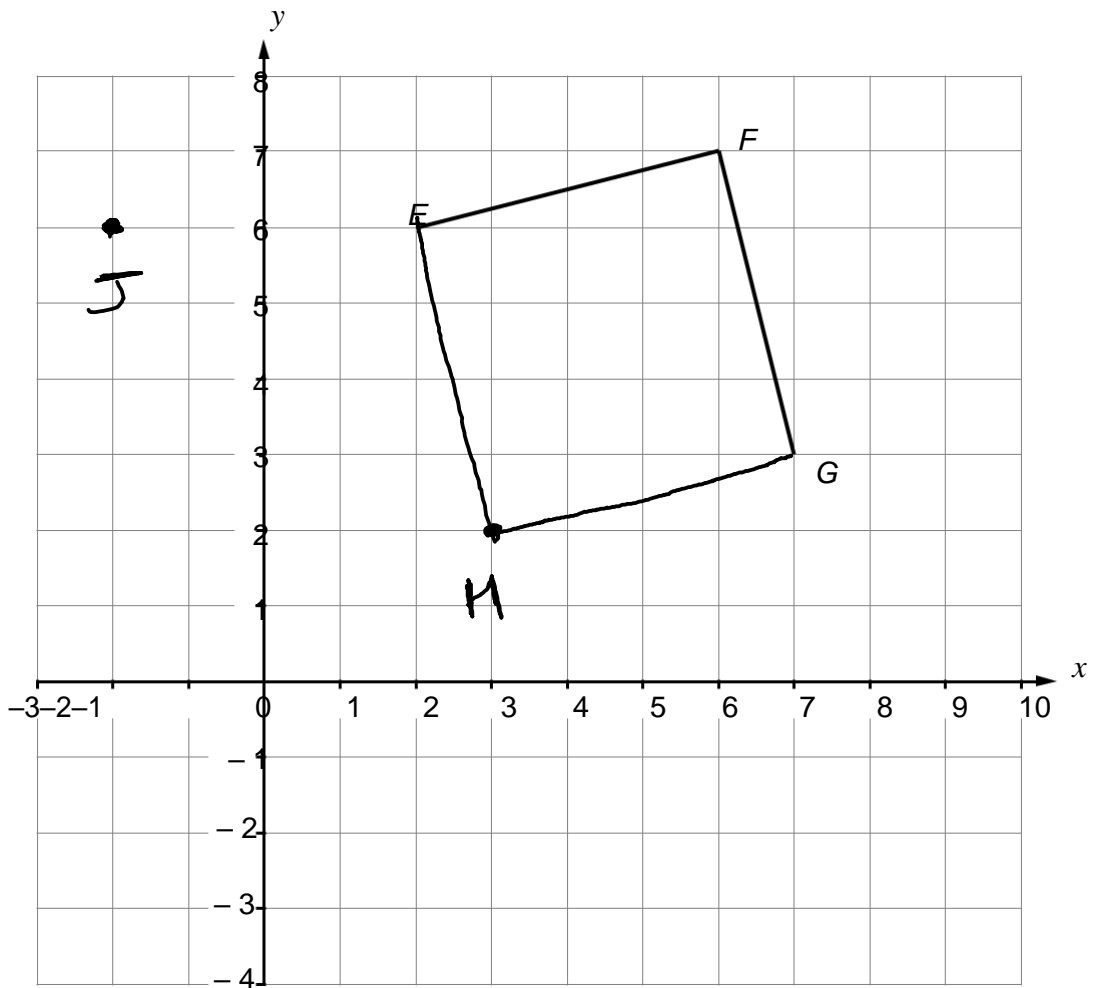
- $AB = 8$ cm,
- angle $A = 90^\circ$,
- $AC = 6.5$ cm.

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]

(3 , 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]

(-2 , 6)

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]

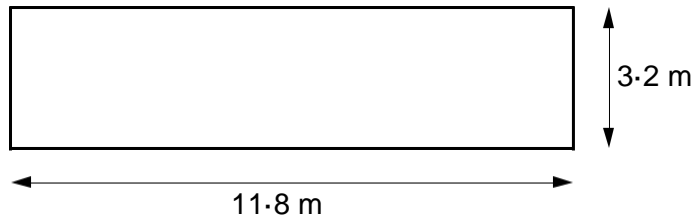


Diagram not drawn to scale

$$3.2 \times 11.8 = 37.76 \text{ m}^2 = \underline{\underline{40 \text{ m}^2}}$$

(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 $110 \div 25 = 4.4$ and says,

"I need to buy 4 tins of paint."

Is Liesel correct?

Yes

No

Explain how you decide.

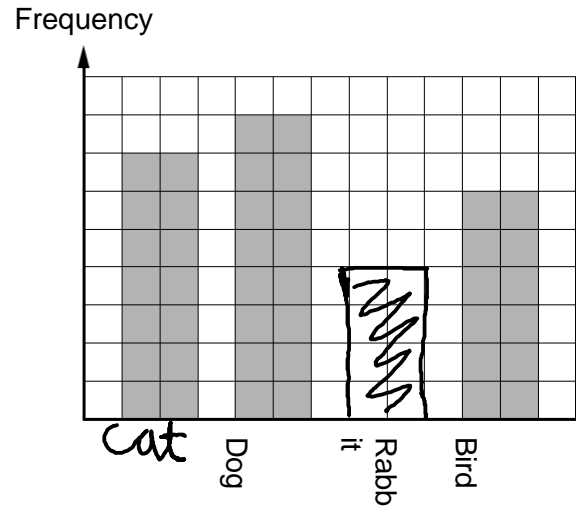
[1]

4 is less than 4.4. She needs more than 4.4 which is 5 tins of paint.

4 will not do the job.

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	16
Rabbit	8
Bird	12



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

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

Dog

(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]

$$\begin{aligned} & \frac{10}{48} \times 360 = 75^\circ \\ & \text{cat} \rightarrow 10 = 75^\circ \end{aligned}$$

(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]

$$\frac{17}{48}$$

5. In the diagram, triangle ABC is isosceles.

AC and DE are parallel, $BAC = 72^\circ$ and $ACD = 37^\circ$.

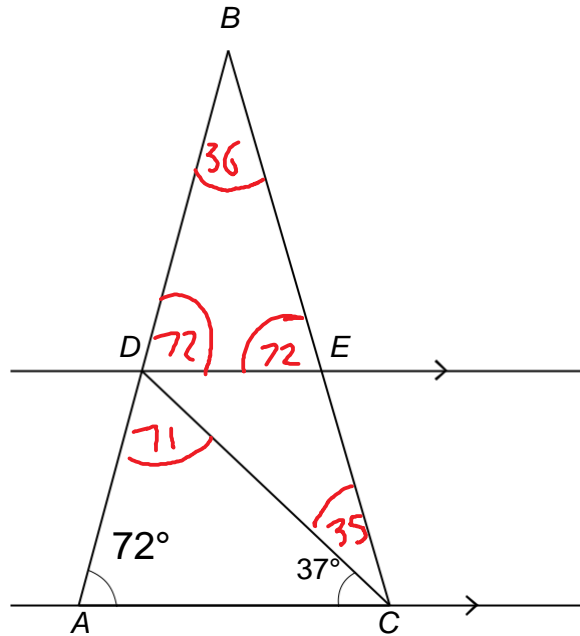


Diagram not drawn to scale

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

(i) BDE

[1]

72°

(ii) CDE

[1]

37°

(iii) ABC

[2]

36°

(b) Write the mathematical name of quadrilateral $ACED$.

[1]

Trapezium

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

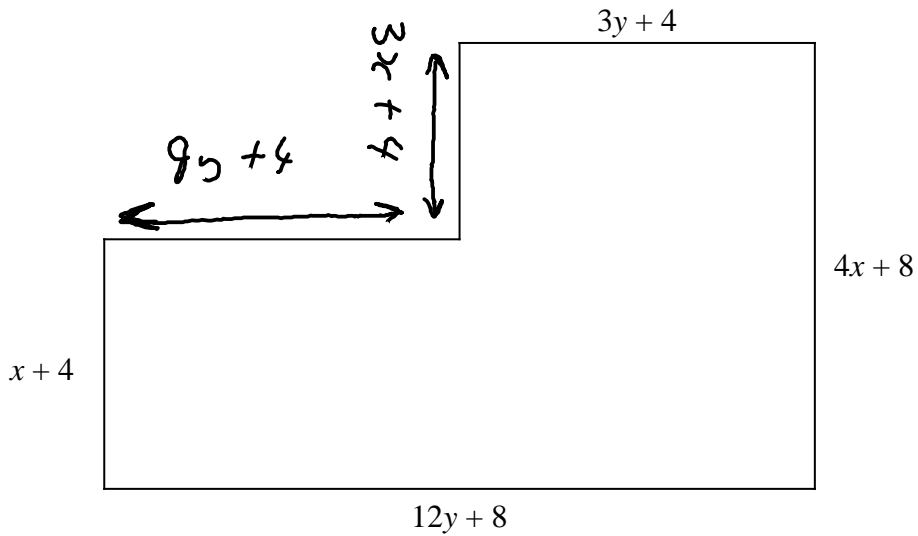


Diagram not drawn to scale

- (a) Write an expression for the perimeter of the shape.
Simplify your expression.

[3]

$$12y + 8 + 9y + 4 + 3y + 4 = \underline{24y + 16}$$

$$x + 3x + 4 + 4x + 8 = \underline{8x + 12}$$

$$8x + 12 + 24y + 16 = \underline{\underline{8x + 24y + 28}}$$

- (b) Use the highest possible number to complete the following sentence.

[1]

'The expression for the perimeter is a multiple of 4.....'

$$\underline{4(2x + 6y + 7)}$$

7.

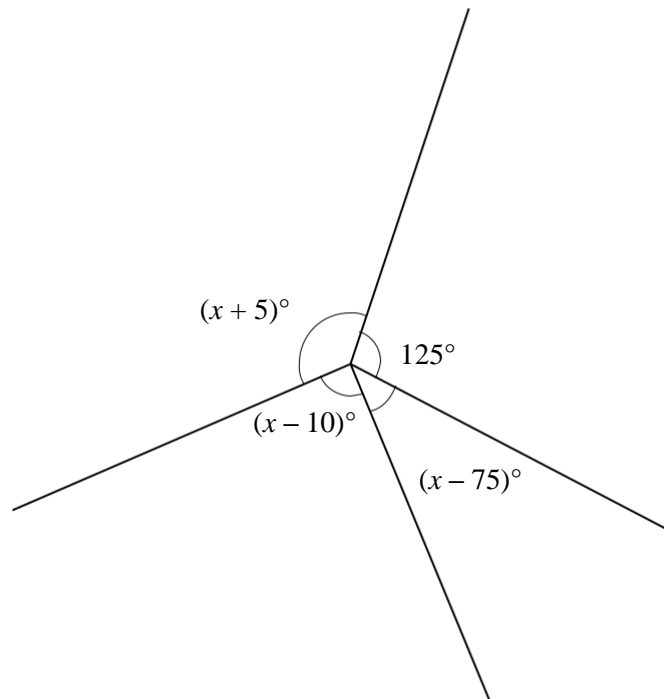


Diagram not drawn to scale

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

[3]

$$125 + x + 5 + x - 10 + x - 75 = 360$$

$$3x + 45 = 360 \rightarrow 3x = 315 \rightarrow x = \underline{\underline{105^\circ}}$$

$$x = \underline{\underline{105^\circ}}$$

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

[3]

$$6x^2 - 16x - 21x + 56$$

$$\underline{\underline{6x^2 - 37x + 56}}$$

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.

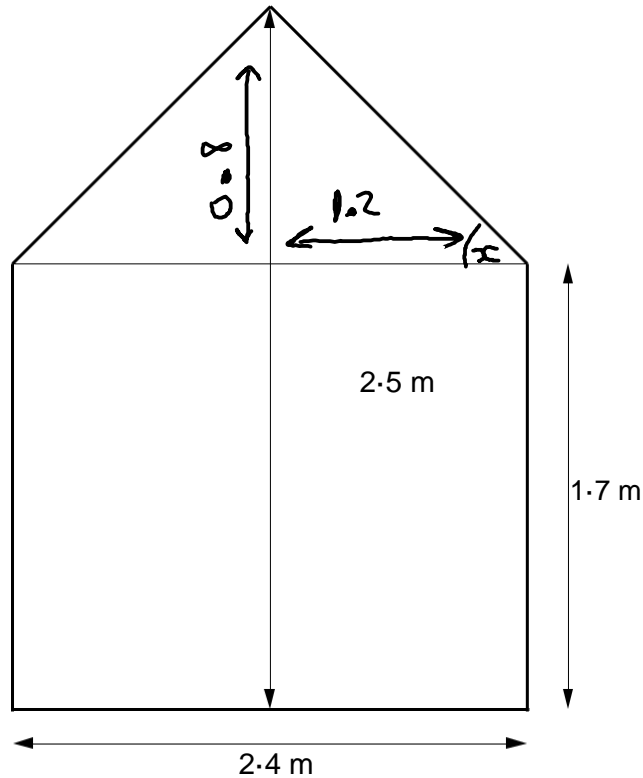


Diagram not drawn to scale

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

$$\tan x = \frac{0.8}{1.2} \rightarrow x = 33.69006753^\circ$$
$$= \underline{\underline{33.7^\circ}}$$

(b) Petra has a mathematically similar shed.

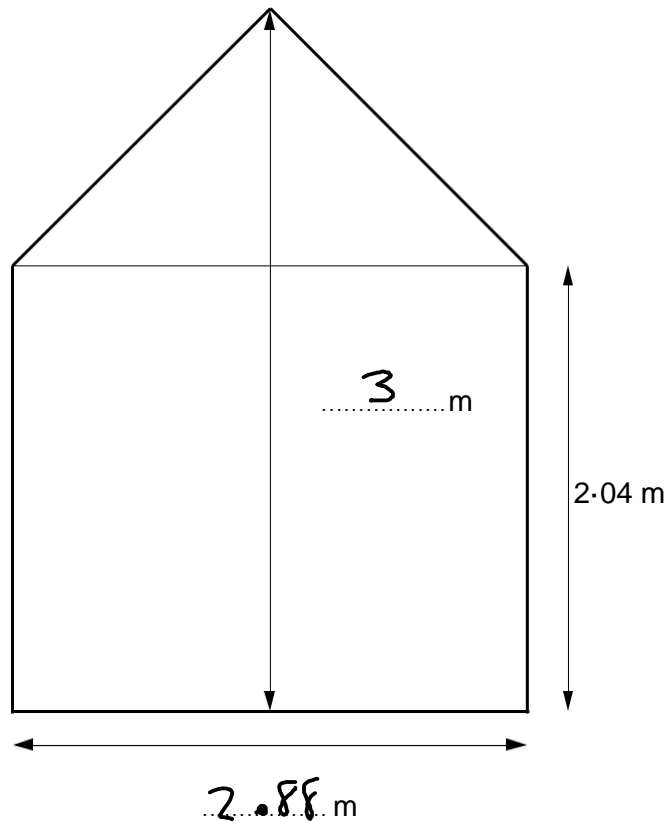


Diagram not drawn to scale

Calculate the two missing measurements on the diagram above.

You must show all your working.

[3]

$$2.04 \div 1.7 = 6/5 = 1.2 \text{ linear scale factor}$$

So for the sides you want in this shed just multiply the same lengths by $6/5$ from Shirveers shed.

$$2.5 \times 6/5 = 3 \text{ m}$$

$$2.4 \times 6/5 = 2.88 \text{ m}$$