# GCSE MATHEMATICS

S21-C300

## With Calculator Assessment Resource C

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 = $\pi rl$

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*

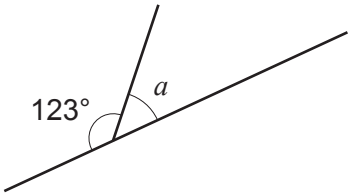
Where $a$ is constant acceleration, $u$ is initial velocity, $v$ is final velocity, $s$ is displacement from the position when $t = 0$ and $t$ is time taken:

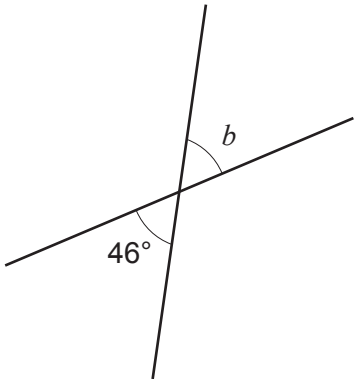
$$v = u + at$$

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

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

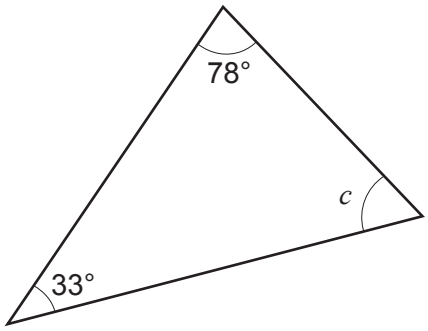
**1.** *(a)* Find the size of each of the angles marked $a$, $b$ and $c$. [4]




$a$ = ..... °

$b$ = ..... °




$c$ = ..... °

*Diagrams not drawn to scale*

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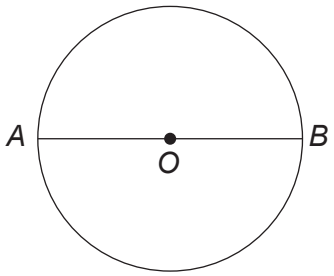
*(b)* Points *A* and *B* are on the circumference of a circle with centre *O*.
Points *A*, *O* and *B* lie on a straight line.




Circle the special name for the straight line *AB*. [1]

circumference diameter tangent radius arc

*(c)* Six slices of pizza are shown in the diagram below.

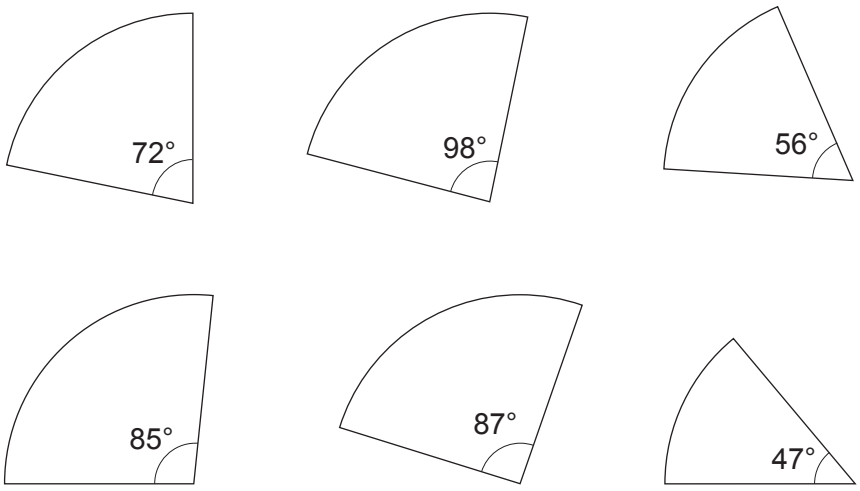



*Diagram not drawn to scale*

Five of the slices make one whole pizza.
One of the slices in the bottom row is from a different pizza.

Which slice is from the different pizza?
You must show all your working. [3]

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**2.** *(a)* Verity is arranging these 6 identical tiles into different shapes.

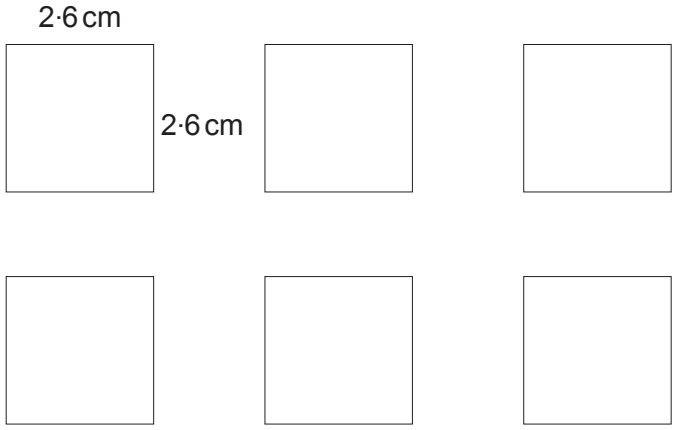
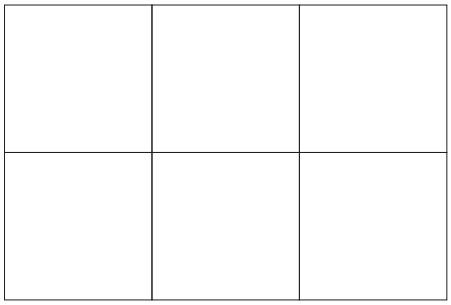



*Diagram not drawn to scale*

Each tile is a square with sides of length 2·6 cm.

Verity makes these two shapes by placing tiles side by side:

Shape 1



Shape 2

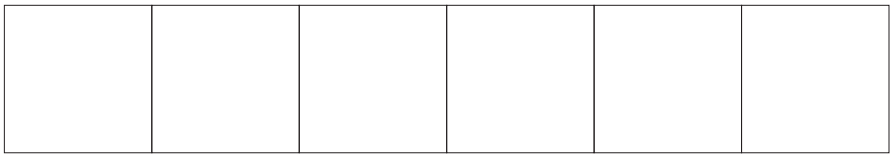


*Diagram not drawn to scale*

Calculate the perimeter of each shape. [3]

Perimeter of shape 1 .....

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Perimeter of shape 2 .....

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*(b)* Maddie has 9 of the same square tiles.
Maddie arranges her 9 tiles to make a shape that has the smallest possible **perimeter**.

(i) Sketch Maddie's shape. [1]

(ii) Calculate the **area** of Maddie's shape. [2]

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Area = ..... $cm^2$

**3.** *(a)* James is looking at this set of numbers.

0·45 0·4 0·0005 1·25 0·99

He says,

"They are all probabilities because they are decimals."

Is James correct? [1]

Yes ☐ No ☐

Give the reason for your answer.

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*(b)* James rolled a fair 6-sided dice 24 times.
How many times would you expect James to roll a six? [1]

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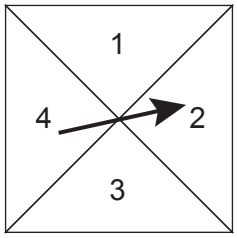
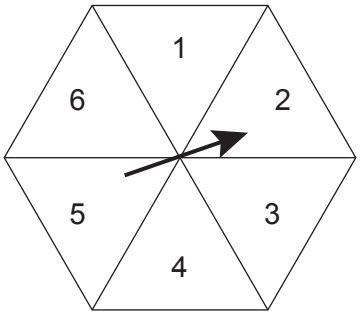
*(c)* The diagrams show a fair 4-sided spinner and a fair 6-sided spinner.




Which spinner has the greater chance of landing on a 2? [1]

4-sided spinner ☐ 6-sided spinner ☐

Show how you decide.

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*(d)* Jago is using a spinner.

The spinner can only land on one of the colours; purple, red, blue, orange or yellow.

The probabilities of yellow and purple occurring on any spin of the spinner are shown in the table below.

| Colour | Purple | Red | Blue | Orange | Yellow |
|---|---|---|---|---|---|
| Probability | 0·33 | | | | 0·25 |

The probabilities of the spinner landing on red, blue and orange are all **equal**.

Complete the table. [3]

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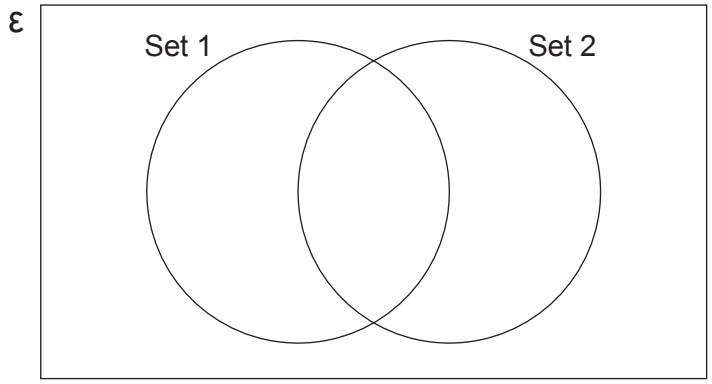
**4.** The universal set (ε), contains the letters from the word TRAPEZIUM.

Set 1 contains the letters of the word PRIME.

Set 2 contains the letters of the word TERM.

*(a)* Show the information in the Venn diagram below. [2]




*(b)* A letter is chosen at random from the word TRAPEZIUM.

What is the probability that the letter chosen is in both of the words PRIME and TERM? [2]

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**5.** *(a)* The usual time taken to complete a journey is 3 hours.

How long should the same journey take when the speed is doubled? [1]

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*(b)* A cyclist rides a distance of 36 km at an average speed of 16 km/h.

Calculate the time taken to complete this ride. Give your answer in hours and minutes. [2]

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*(c)* Sidney the snail slides a distance of 180 m in 24 hours.

Calculate Sidney's average speed in **cm per hour**. [3]

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**6.**

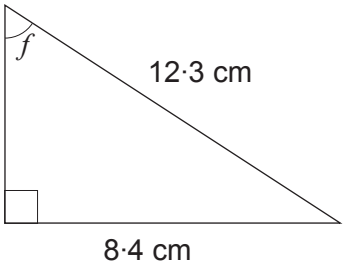


*Diagram not drawn to scale*

Calculate the size of angle $f$. [3]

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**7.** A car travels at an average speed of 45 mph for 40 minutes.
The next part of the car's journey takes 25 minutes at an average speed of 60 mph.

Show that the average speed of the entire journey is just over 50 mph. [5]

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**8.** The density of glass in a bottle is 2·4 g/cm$^3$.
The volume of glass used to make the bottle is 13·4 cm$^3$.

Calculate the mass of the glass bottle.
Give your answer in grams. [2]

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Mass ..... g