Name:

# The End of Year 11

## Additional Tasks

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# Quiz 1

| | | |
|---|---|---|
| 1) Simplify the fraction $\frac{72}{84}$. | 2) Evaluate $4^{-2}$. | 3) Calculate 30% of £50. |
| 4) $\sqrt{16} \times \sqrt{36}$ | 5) Solve $\frac{x}{2} = 6$ | 6) Expand $(x + 6)(x - 3)$ |
| 7) How many edges does a nonagon have? | 8) What is the sampling interval when choosing a systematic sample 7 out of 40 people? | 9) The range of 7, 3, 8, 9, 4 |

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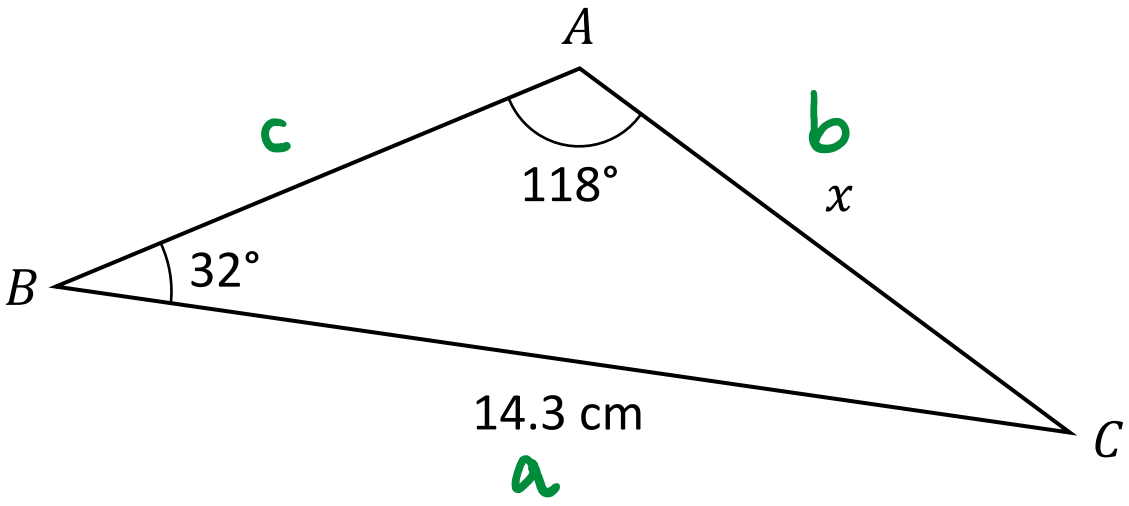
# Example 1

Calculate the missing length $x$.




The Sine Rule:

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

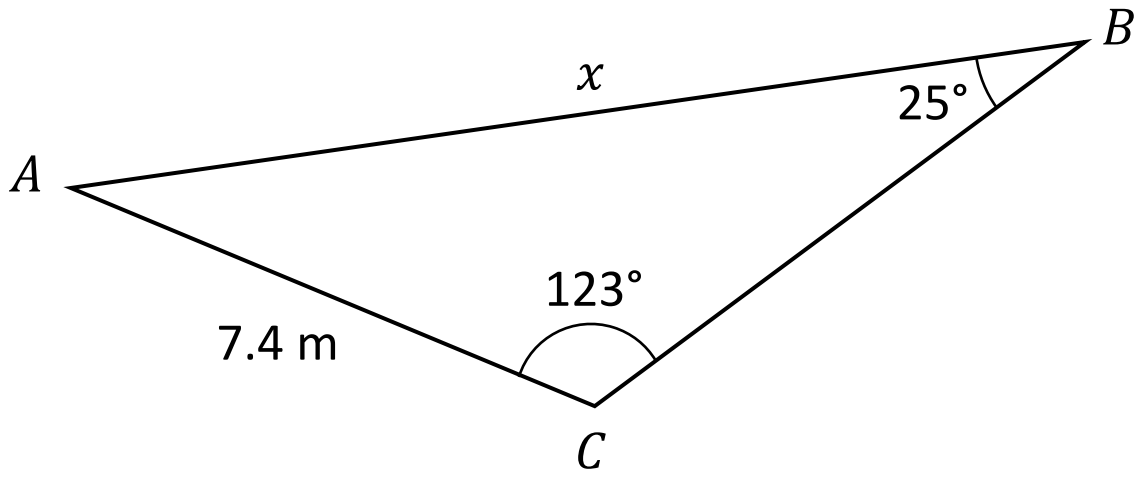
$$\frac{14.3}{\sin 118^\circ} = \frac{x}{\sin 32^\circ}$$

$$\left(\frac{14.3}{\sin 118^\circ}\right) \times \sin 32^\circ = x$$

$$x = 8.58 \text{ cm to 2 d.p.}$$

# Exercise 1

Calculate the missing length $x$.

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# Quiz 2

What is the formula?

| | | |
|---|---|---|
| 1) Area of a Circle = | 2) Density = | 3) Length of an Arc = |
| 4) Population Density = | 5) Volume of a Cuboid = | 6) Area of a Trapezium = |
| 7) Area of a Parallelogram = | 8) Area of a Triangle = | 9) Volume of a Sphere = |

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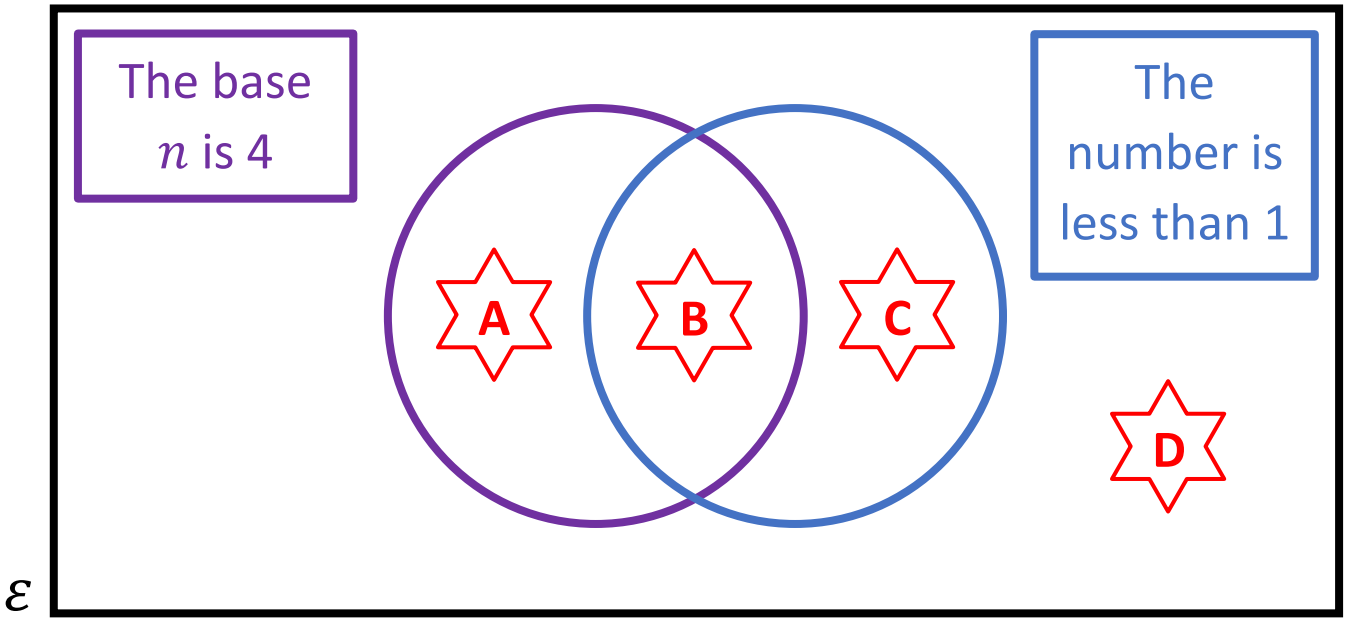
# Venn Diagram Challenge 1




Think of a number of the form $n^a$ that could fit into each region.
If you think a region is impossible to fill, explain why!

A

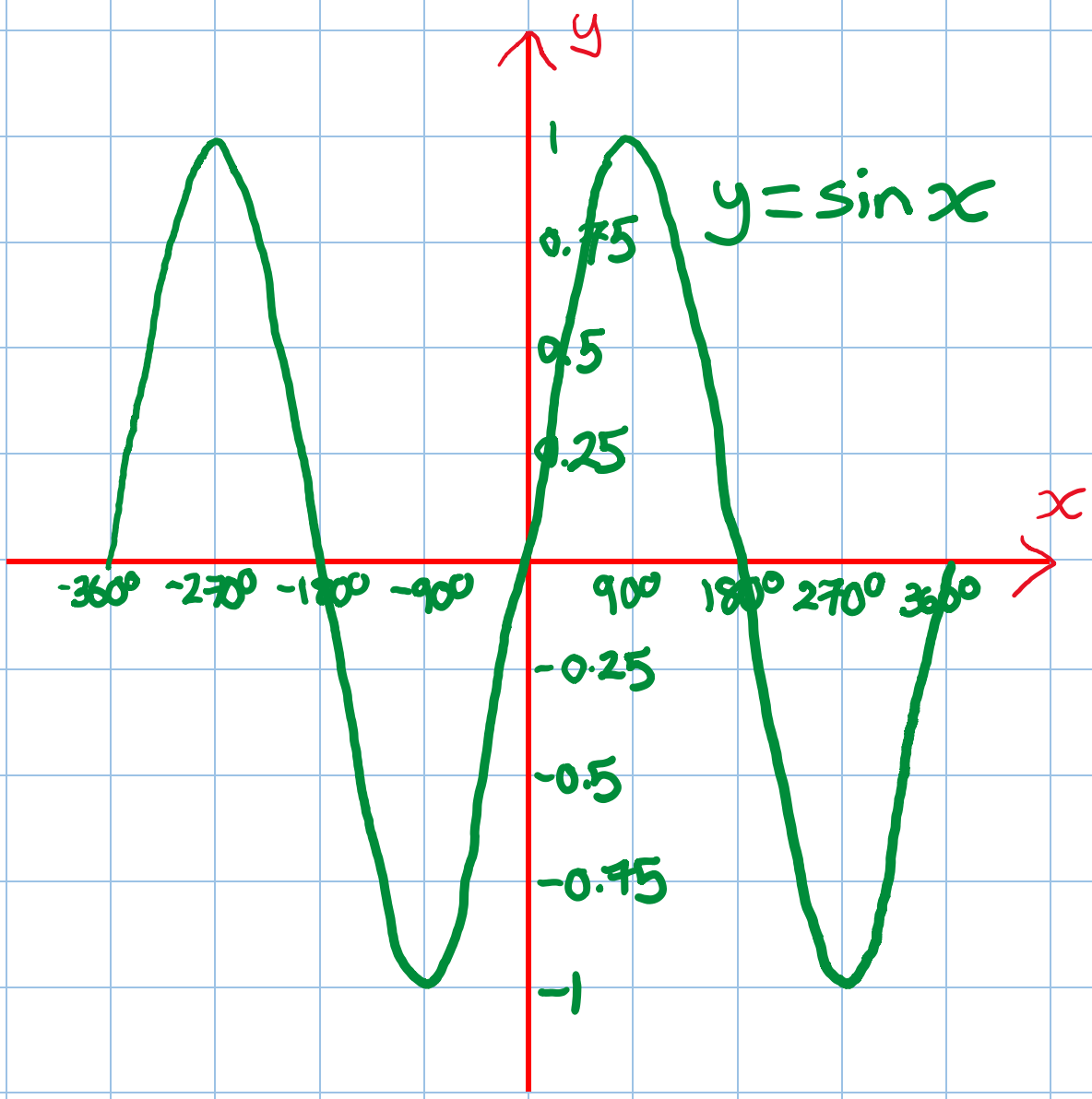
B

C

D

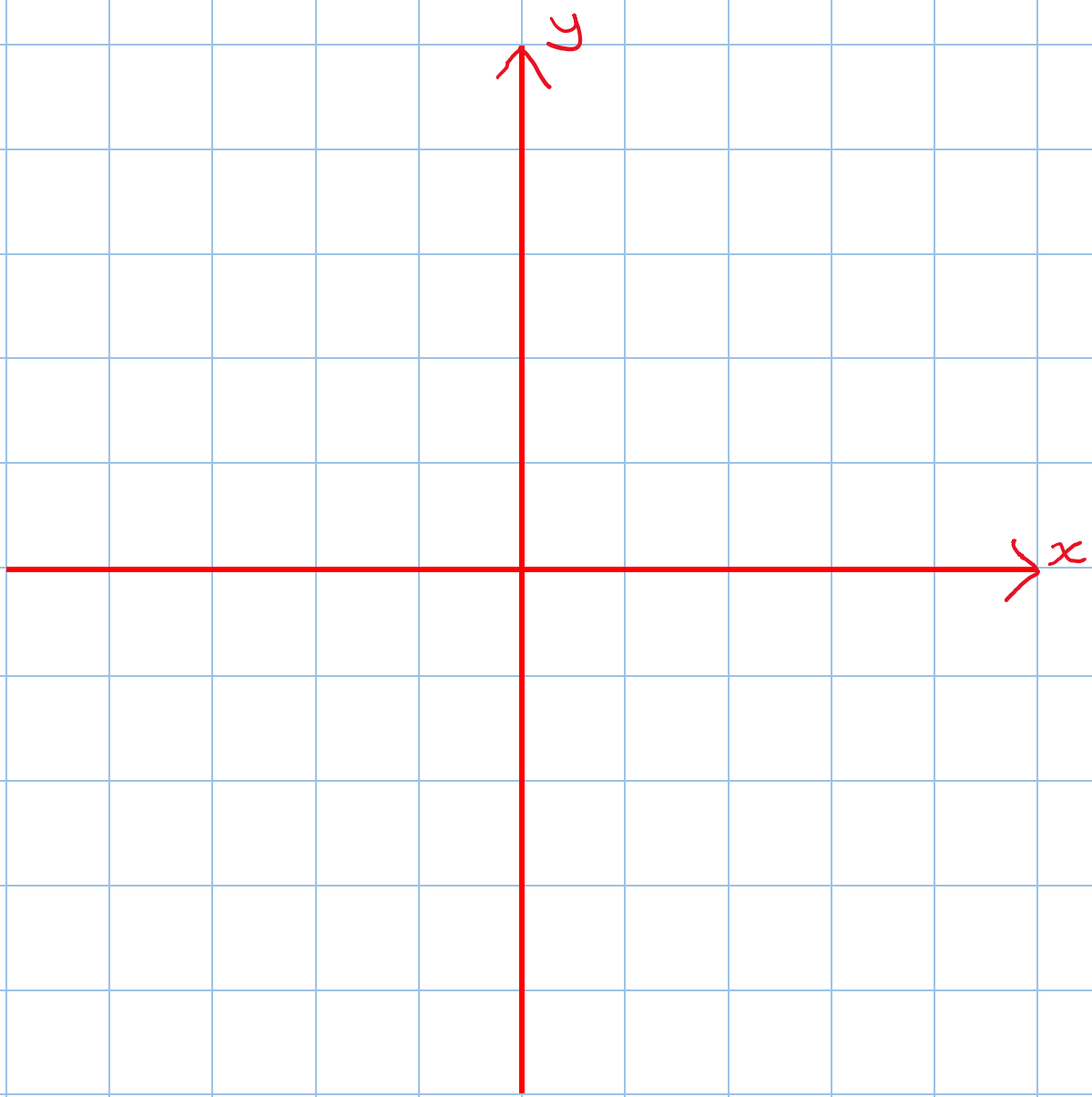
# Example 2

Sketch the graph $y = \sin x$ for values of $x$ between $-360°$ and $360°$.



# Exercise 2

Sketch the graph $y = \cos x$ for values of $x$ between $-360°$ and $360°$.

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# Quiz 3

| | | | | |
|---|---|---|---|---|
| $8 \times 7$ | $2 \div 0.5$ | $4 - -3$ | $18 \div -2$ | $2.1 + 0.5$ |
| $9 \times 8$ | $3 \div 0.25$ | $2 + -7$ | $-9 \div 3$ | $0.3 - 0.5$ |
| $6 \times 12$ | $1 \div 0.2$ | $-3 + -4$ | $-15 \div -3$ | $2.3 \times 3$ |
| $9 \times 7$ | $5 \div 0.1$ | $-5 - 6$ | $-4 \times 3$ | $5 \div 10$ |
| $11 \times 12$ | $3 \div 0.3$ | $-2 - +3$ | $-8 \times -6$ | $4 - 2.6$ |

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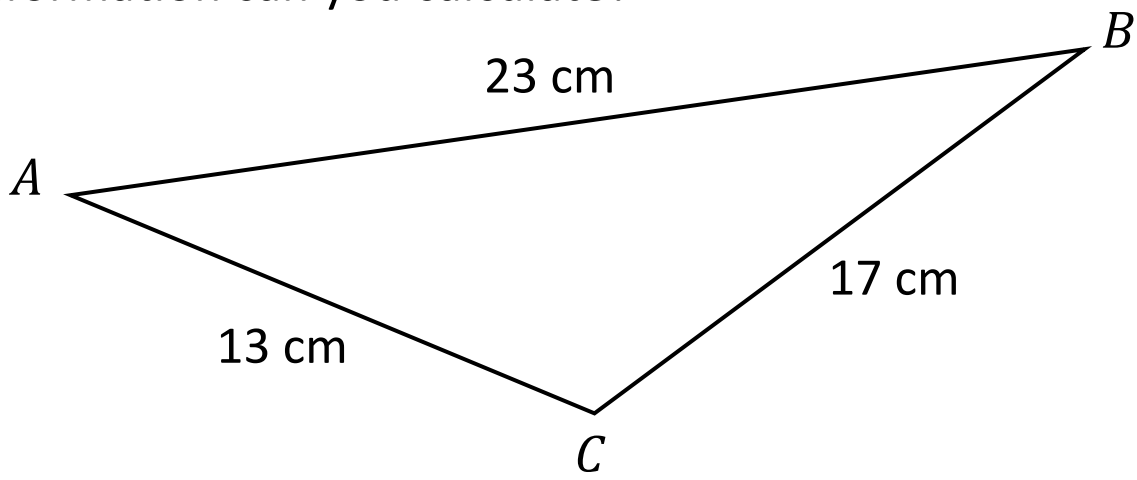
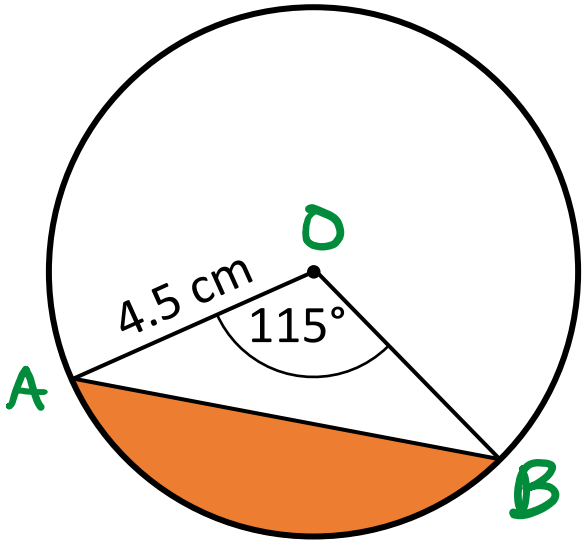
# The Triangle

For the triangle shown below, what additional information can you calculate?



# Example 3

What is the area of the orange segment?




Area of sector AOB

$= \frac{\theta}{360} \times \pi r^2$

$= \frac{115^\circ}{360} \times \pi \times 4.5^2$

$= 20.322177748 cm^2$

Area of triangle AOB

$= \frac{1}{2} ab \sin C$

$= \frac{1}{2} \times 4.5 \times 4.5 \times \sin 115^\circ$

$= 9.176366344 cm^2$

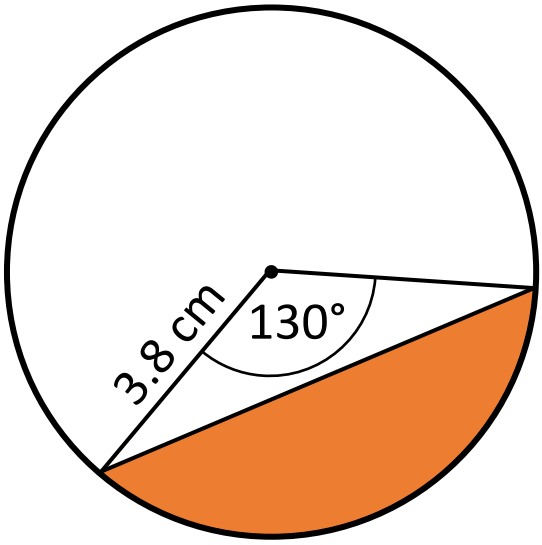
Area of the orange segment

$= 20.322177748 - 9.176366344$

$= 11.15 cm^2$ to 2 d.p.

# Exercise 3

What is the area of the orange segment?

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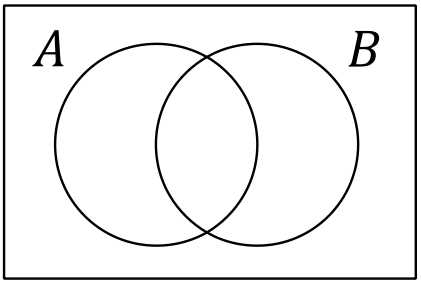
# Quiz 4

| | | |
|---|---|---|
| 1) How does the column vector $\begin{pmatrix} 6 \\ -4 \end{pmatrix}$ move a shape? | 2) In which quadrant is the co-ordinate (–5, 2)? | 3) Shade $A'$.<br>  <br><br>$\varepsilon$ |
| 4) Sketch a kite. | 5) Share £48 between Ann and Bryn according to the ratio 3 : 5. | 6) What is the $n$th term of the sequence 16, 13, 10, 7, 4, ...? |
| 7) Evaluate $36^{\frac{1}{2}}$. | 8) Make $x$ the subject of the formula $y = 3x - 6$. | 9) What is the lower bound of the measurement 25 cm, measured to the nearest cm? |

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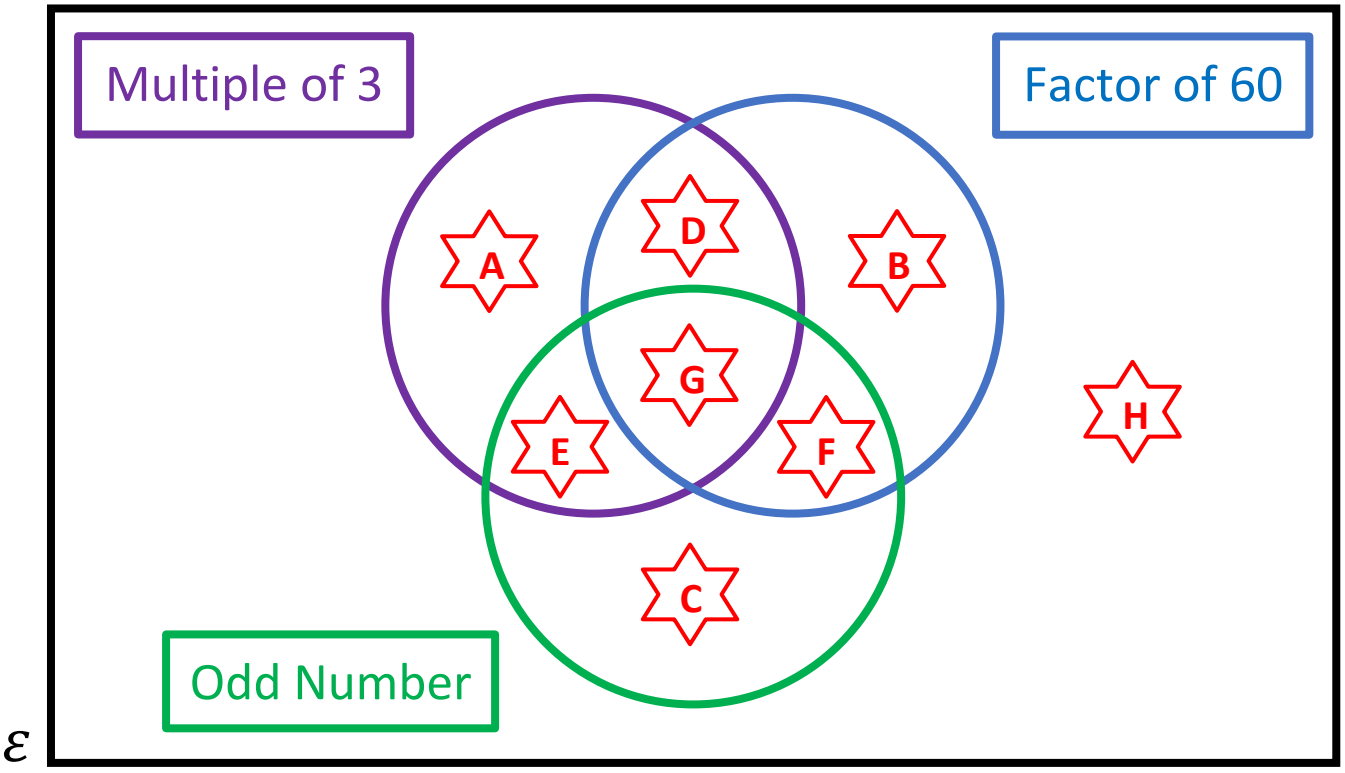
# Venn Diagram Challenge 2




Think of a number that could fit into each region. If you think a region is impossible to fill, explain why!

A

B

C

D

E

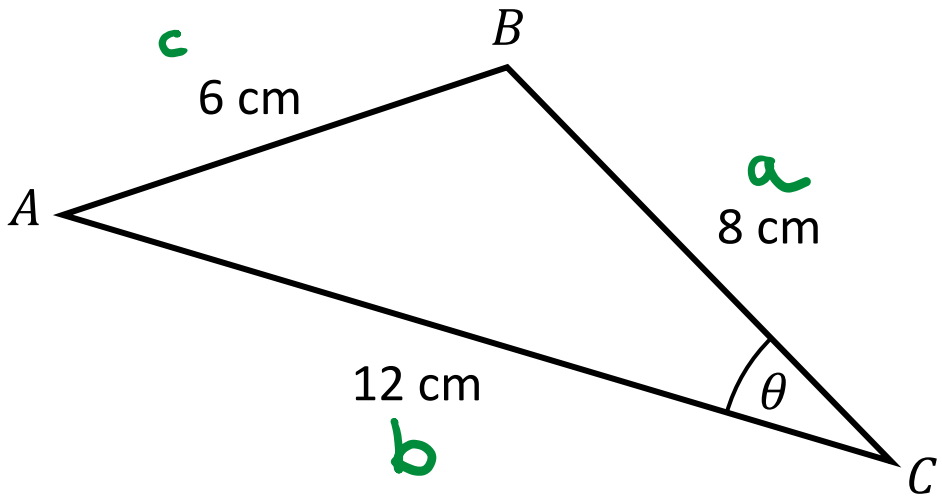
F

G

H

# Example 4

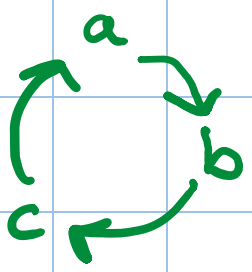
Calculate the size of the angle $\theta$.




Cosine Rule for finding angles:

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

$$\cos C = \frac{a^2+b^2-c^2}{2ab}$$



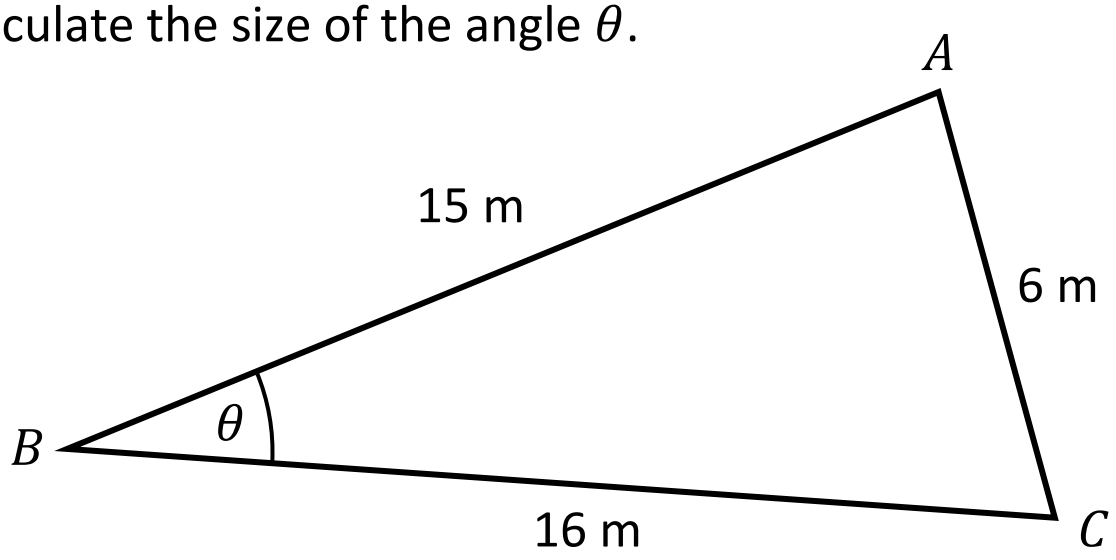

$$\cos\theta = \frac{8^2+12^2-6^2}{2\times 8\times 12}$$

$$\theta = \cos^{-1}\left(\frac{8^2+12^2-6^2}{2\times 8\times 12}\right)$$

$\theta = 26.38°$ to 2 d.p.

# Exercise 4

Calculate the size of the angle $\theta$.

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# Quiz 5

| | | |
|---|---|---|
| 1) Solve the inequality $2x + 3 < 8$ | 2) Write two different formulae for calculating the area of a triangle. | 3) Simplify $x^4 \times x^2$. |
| 4) What are the next two numbers?<br>1, 4, 9, 16, ....., ..... | 5) Factorise $x^2 + 9x + 20$. | 6) In a box and whisker diagram, the line in the middle of the box represents the... |
| 7) Expand $(x - 4)(x + 8)$. | 8) What is the circumference of a circle with radius 7.5 cm? | 9) What is the reciprocal of $\frac{4}{5}$? Write your answer as a mixed number. |

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# Square Root of 40

1) Which number do you obtain on squaring $\sqrt{40}$?

2) Between which two whole numbers does $\sqrt{40}$ appear?

$$\sqrt{40}$$

3) Write $\sqrt{40}$ in the form $a\sqrt{b}$, where $a$ and $b$ are whole numbers.

4) $\sqrt{40}$ is the hypotenuse of a right-angled triangle. Find the two other lengths of the triangle, given they are whole number lengths.

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# Evaluating the Workbook

# Notes