A

# AQA

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

GCSE

MATHEMATICS

H

Higher Tier   Paper 1 Non-Calculator

8300/1H

Tuesday 6 November 2018   Morning

Time allowed: 1 hour 30 minutes

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

For this paper you must have:
- mathematical instruments
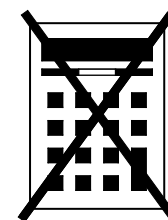
You must NOT use a calculator.

INSTRUCTIONS

- **Use black ink or black ball-point pen. Draw diagrams in pencil.**

- **Answer ALL questions.**

- **You must answer the questions in the spaces provided. Do not write on blank pages.**

- **Do all rough work in this book. Cross through any work you do not want to be marked.**

3

INFORMATION

- **The marks for questions are shown in brackets.**

- **The maximum mark for this paper is 80.**

- **You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.**

ADVICE

In all calculations, show clearly how you work out your answer.

DO NOT TURN OVER UNTIL TOLD TO DO SO

03

4

Answer ALL questions in the spaces provided.

1   **Simplify** $\left(5^4\right)^2$

Circle your answer. [1 mark]

5^6 5^8 25^6 25^8

2   **Circle the volume, in cm^3, of a cylinder with radius 5 cm and height 8 cm   [1 mark]**

40π 80π

200π 1600π

5

3   Simplify $16a^2 \div a + 3a \times 2$

Circle your answer. [1 mark]

22a   **8a**   **38a**   **2a**

4   Circle the value of cos 30º [1 mark]

$\dfrac{1}{2}$ $\dfrac{\sqrt{3}}{2}$ **0**   **1**

[Turn over]

6

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5   **Work out** $8\dfrac{1}{2} \div 2\dfrac{2}{3}$

Give your answer as a mixed number. [4 marks]

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Answer _____

[Turn over]

8

6 **A ship is sailing in a straight line from its home port.**

The distance-time graph, on page 9, shows 4 hours of the journey.

Work out the speed of the ship during these 4 hours. [3 marks]
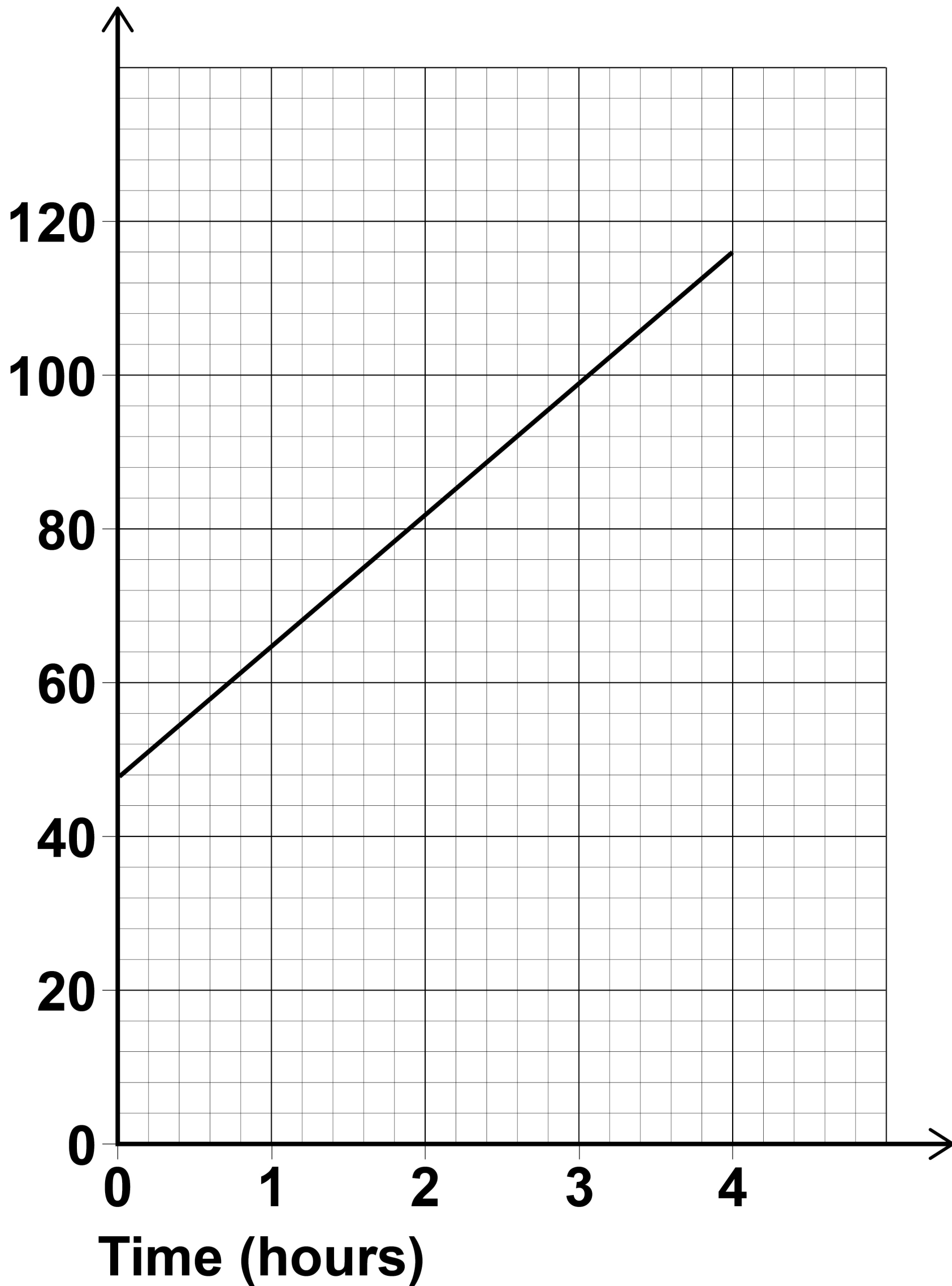
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Answer _____**mph**

Distance from home port (miles)

Time (hours)

[Turn over]

7   **The sum of the angles in any quadrilateral is 360º**

For example, in a rectangle 4 × 90º = 360º

Zak writes,

5 × 90º = 450º so the sum of the angles in any pentagon must be 450º

Is he correct?

Tick a box.

☐ **Yes**   ☐ **No**

Show working to support your answer.   [2 marks]

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[Turn over]

$\overline{5}$

8 **Kim works at an airport in the UK.**

She records the number of planes landing between 10 am and 2 pm each day.

The tables show the data for the first 10 days in January.

Day	1	2	3	4	5
Number of planes	148	151	147	155	153

Day	6	7	8	9	10
Number of planes	147	155	102	151	154

8 (a) **The airport was affected by fog on one of the days.**

Which day do you think it was?

Give a reason for your answer.
[1 mark]

Day _____

Reason _____

_____

_____

[Turn over]

14

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8 (b) **Kim uses the data to predict how many planes will land at the airport in a year.**

In her method, she

uses an estimate of 150 planes in each 4-hour period throughout the day

assumes the same number of planes each day.

Work out her prediction.
[3 marks]

_____

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Answer _____

8 (c) **In fact,**

fewer planes land in winter than in summer

fewer planes land at night than during the day.

What does this tell you about Kim's prediction?

Tick ONE box.

☐ **Her prediction is too low**

☐ **Her prediction is too high**

☐ **Her prediction could be too low or too high**

17

Give a reason for your answer.
[2 marks]

_____

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[Turn over]

$\overline{\boxed{6}}$

9 $\quad \sqrt{6^2 + 8^2} = \sqrt[3]{125a^3}$

Work out the value of a. **[4 marks]**

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Answer _____

19

10 **Work out the percentage increase from 80 to 280 [3 marks]**

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Answer _____ %

[Turn over]

20

11 Here are four triangles.

The diagrams are not drawn accurately.

A

8 cm   25°

56°

B

56°

8 cm

25°

C

56°

25°

8 cm

D

25°

56°

8 cm
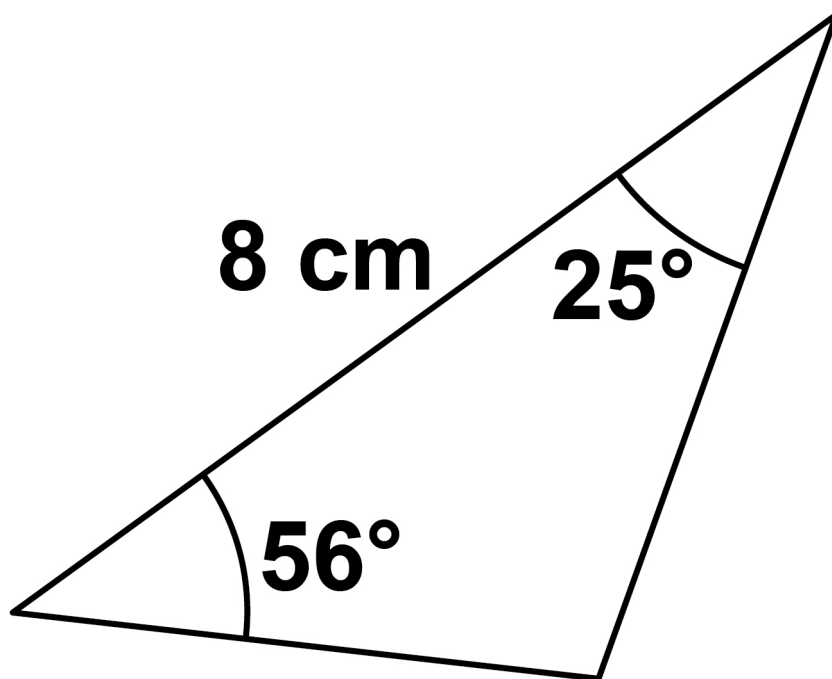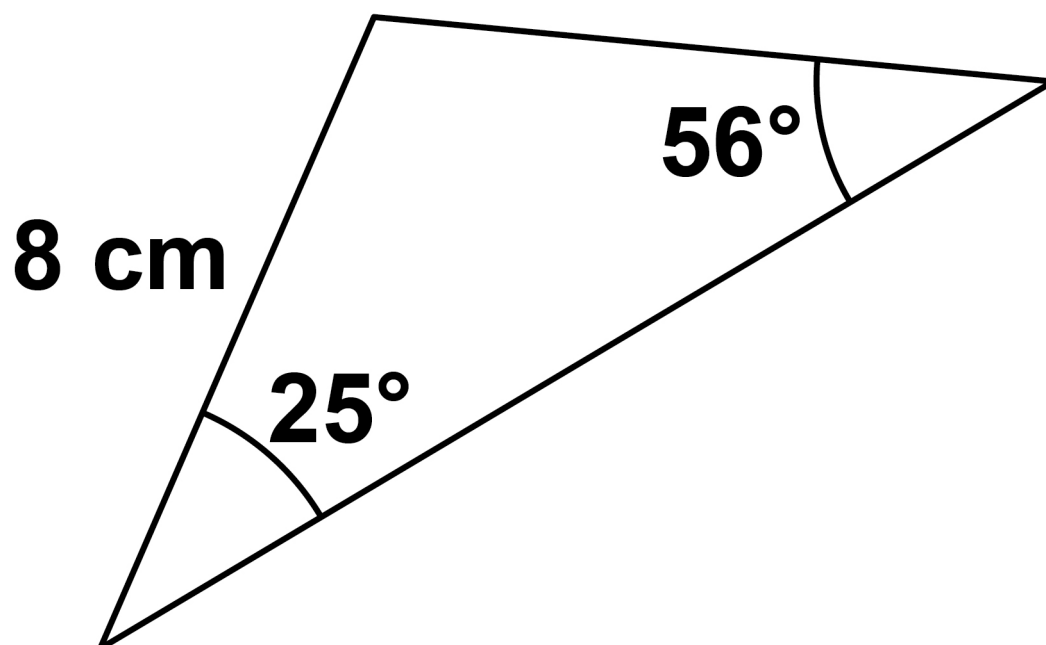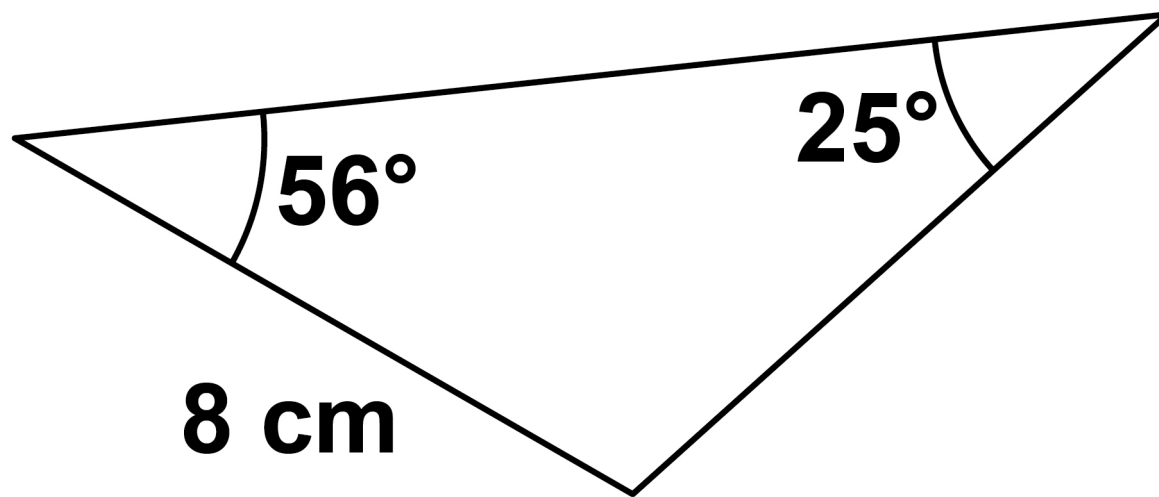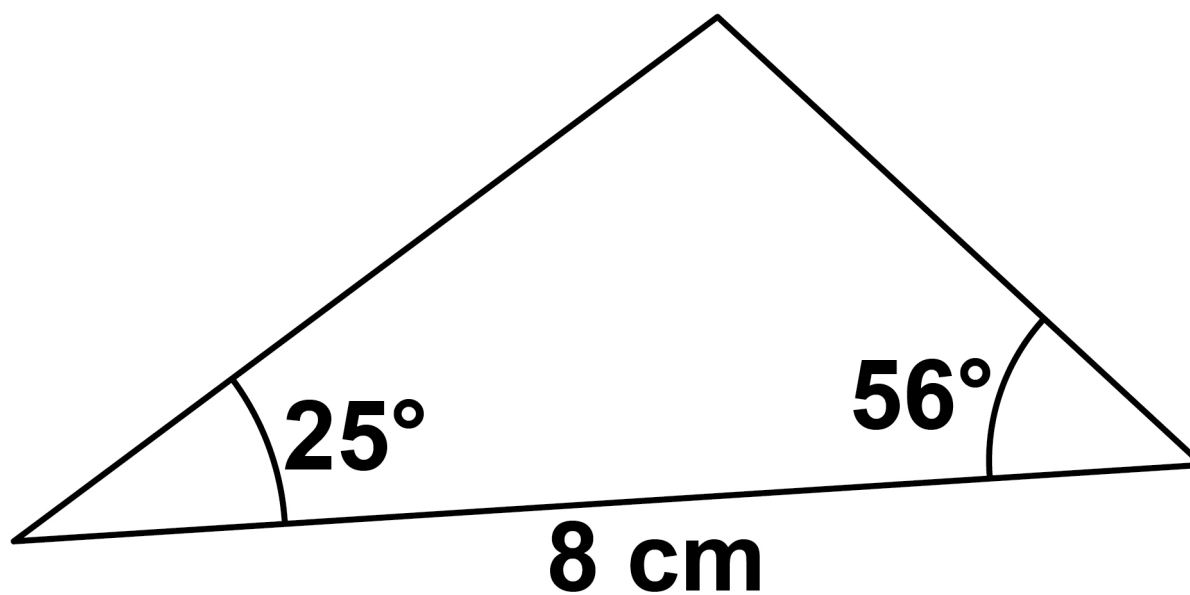
Which TWO triangles are congruent?

Circle TWO letters below. [1 mark]

A   B   C   D

[Turn over]

8

12 **Solve** $x^2 - x - 12 = 0$ **[3 marks]**

_____

_____

_____

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Answer _____

13 $e : f$ = **2 : 3** and $f : g$ = **5 : 4**

Work out $e : g$

Give your answer in its simplest form. **[3 marks]**

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Answer _____ : _____

[Turn over]

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14 **A and B are two events.**

Some probabilities are shown on the Venn diagram.

ξ A   B

0.3   0.15   0.35
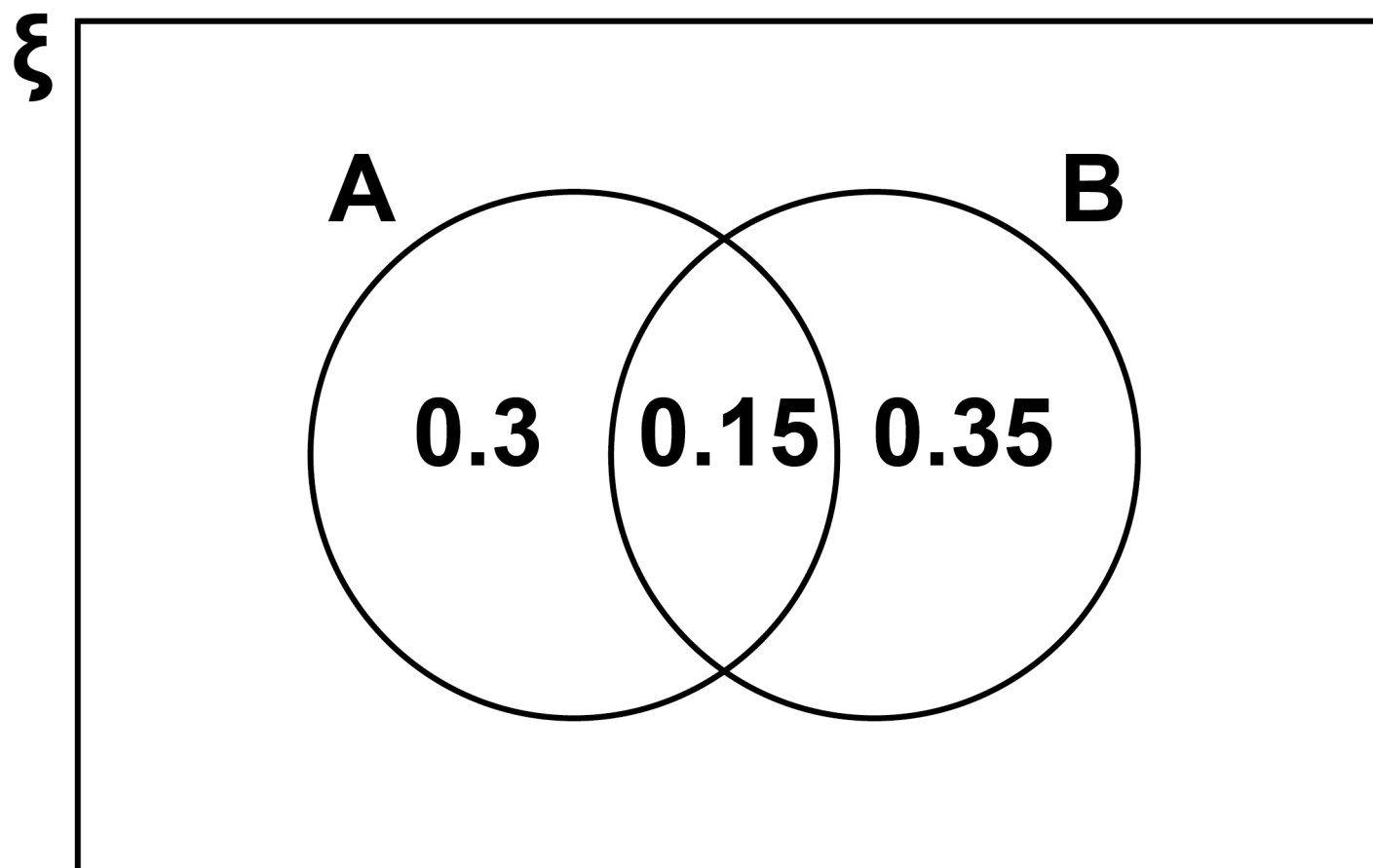
Work out $P(A' \cup B)$ **[2 marks]**

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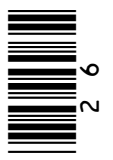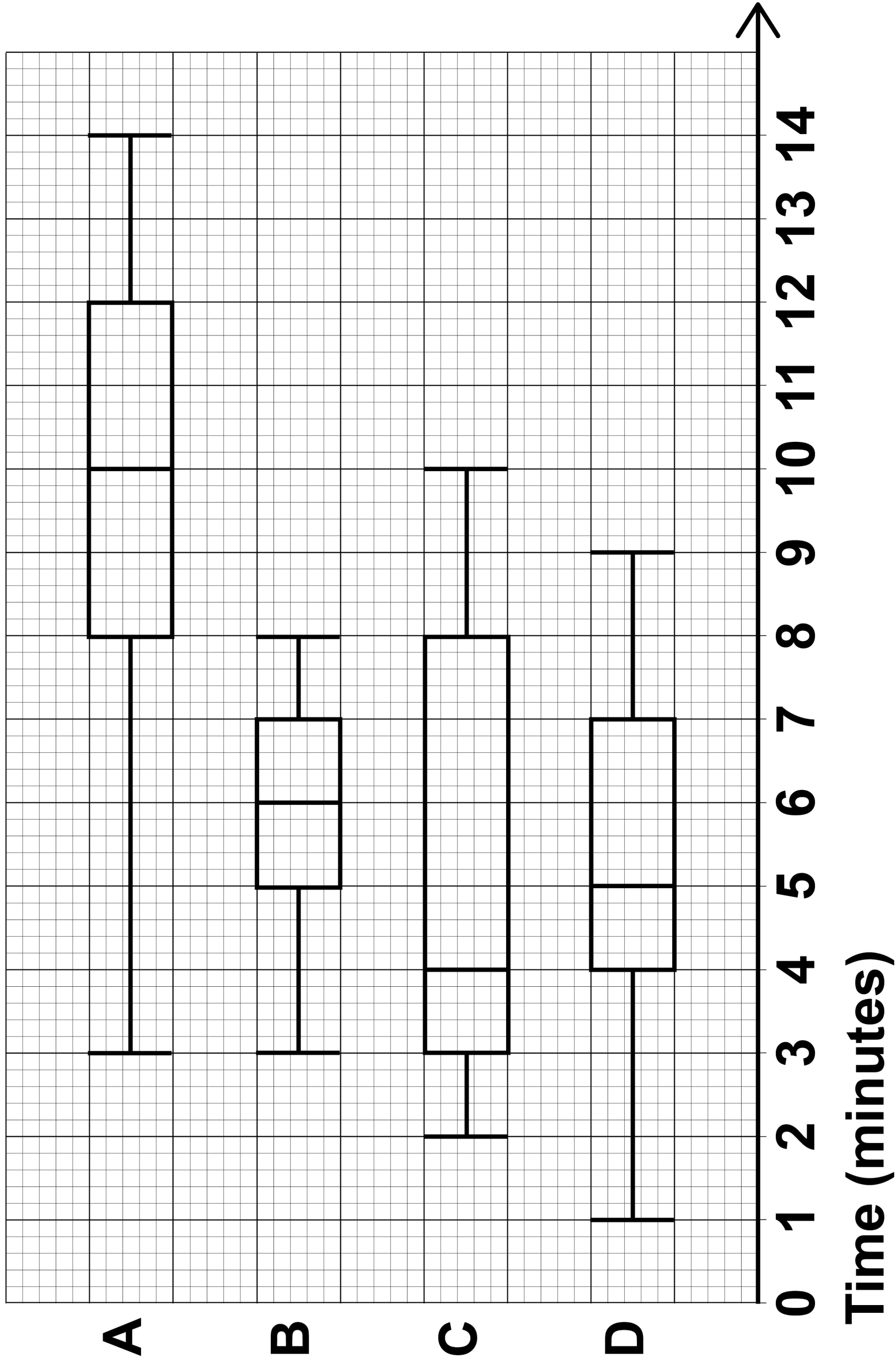_____

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Answer _____

[Turn over]

8

Queuing times

Time (minutes)

15 In a survey, queuing times at supermarket checkouts were recorded.

One morning, samples of 50 customers were taken at supermarkets A, B, C and D.

The box plots, on page 26, represent the results.

15 (a) On average, which supermarket had the lowest queuing times?   [2 marks]

Give a reason for your answer.

Supermarket _____

Reason _____

_____

BLANK PAGE

15 (b)   At which supermarket were the queuing times most consistent?

Give a reason for your answer.   [2 marks]

Supermarket _____

Reason _____

_____

16 **Circle the number that is closest to the value of** 29^3 **[1 mark]**

27 000   90

2700   9000

17 **Work out the exact value of**

$$\left(\frac{3}{4}\right)^{-3}$$

[2 marks]

_____

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_____

Answer _____

$\overline{7}$

31

BLANK PAGE

[Turn over]

18 **Beth and Mia translate documents from Spanish into English.**

A set of documents that would take Beth 8 days would take Mia 10 days.

Beth starts to translate the documents.

After 2 days Beth and Mia both work on translating the documents.

How many MORE days will it take to complete the work?

You MUST show your working.
[4 marks]

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Answer _____**days**

[Turn over]

19   In a chess club, there are x boys and y girls.

19 (a)   If 5 more boys and 8 more girls join, there would be half as many boys as girls.

Show that $y = 2x + 2$
[2 marks]

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3 4

19 (b) **If instead,**

10 more boys and 1 more girl join, there would be the same number of boys and girls.

Work out x and y.   [3 marks]

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$x =$ _____

$y =$ _____

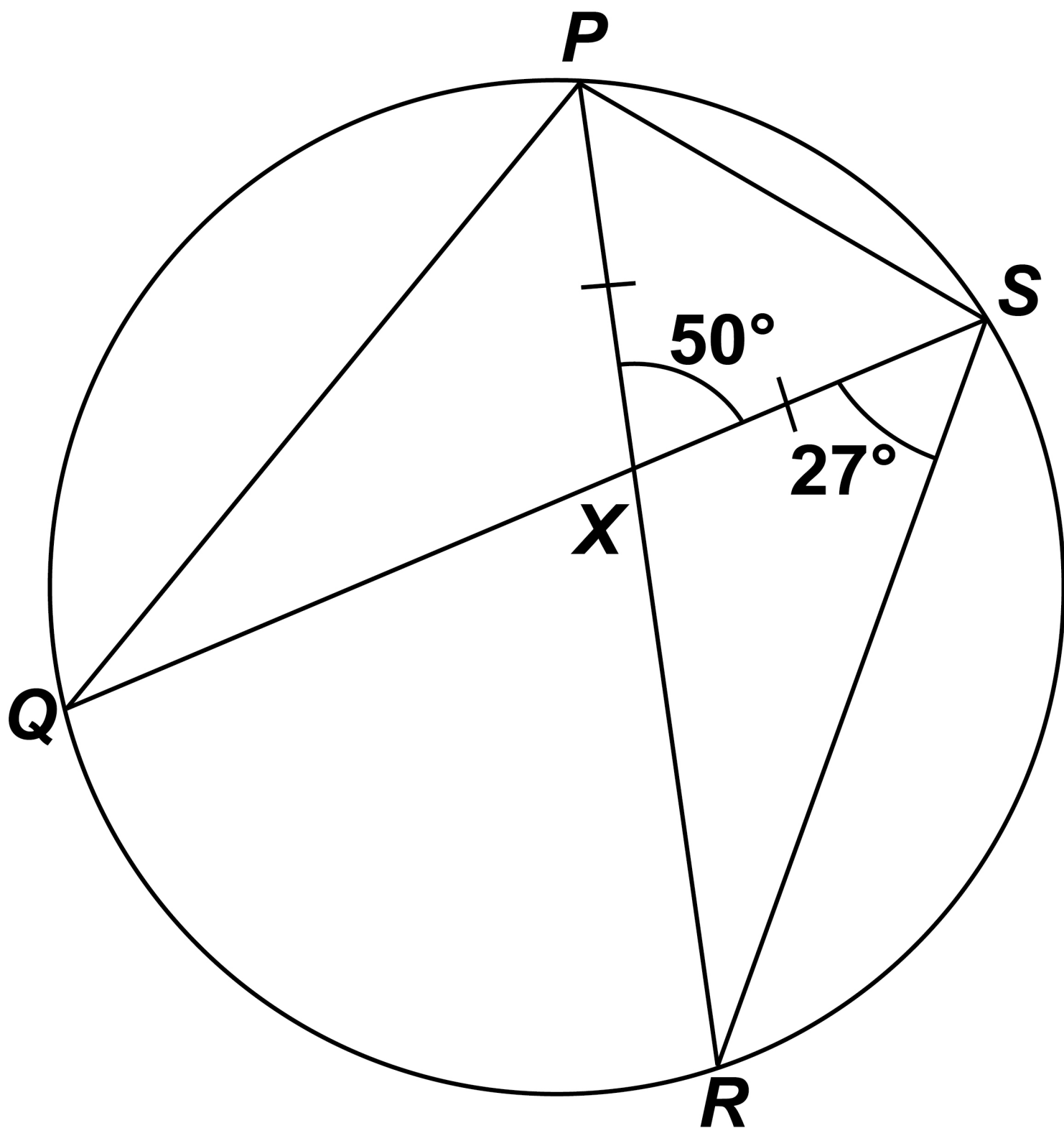**[Turn over]**

9

20   *P*, *Q*, *R* and *S* are points on a circle.

PXR and *QXS* are straight lines.

PX = SX

The diagram is not drawn
accurately.

37

Prove that *QS* is NOT a diameter of the circle. [4 marks]

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[Turn over]

21 **Here are the first four terms of a quadratic sequence.**

11   26   45   68

Work out an expression for the nth term. [3 marks]

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Answer _____

[Turn over]

7

22 **Solve** $\dfrac{x}{x+4} + \dfrac{7}{x-2} = 1$

You MUST show your working.
[4 marks]

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41

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$x =$ _____

[Turn over]

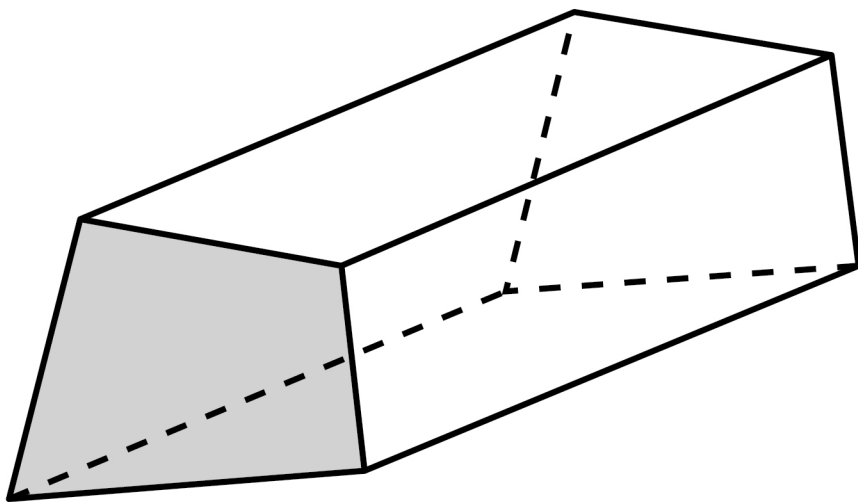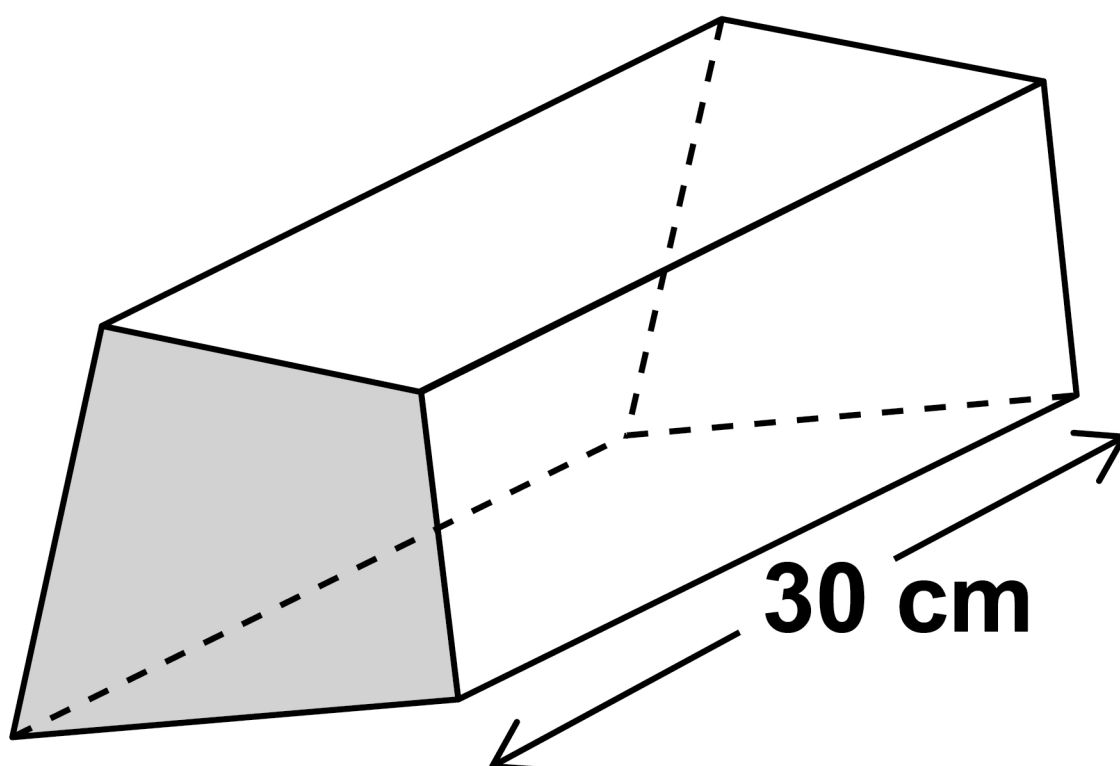**23** **Prisms A and B are similar.**

The cross sections are shaded.

Prism A
volume = 480 cm^3

Prism B
volume = 30 cm

30 cm

area of the cross section of A : area of the cross section of B = 4 : 9

Work out the area of the cross section of B. [5 marks]

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Answer _____ cm^2

[Turn over]

$\dfrac{}{9}$

24 **Show that** $\dfrac{2\sqrt{6}}{\sqrt{5}} - \dfrac{\sqrt{3}}{\sqrt{10}}$ **can be written**

in the form $\dfrac{c\sqrt{d}}{10}$ **where** c **and** d **are**

integers. **[3 marks]**

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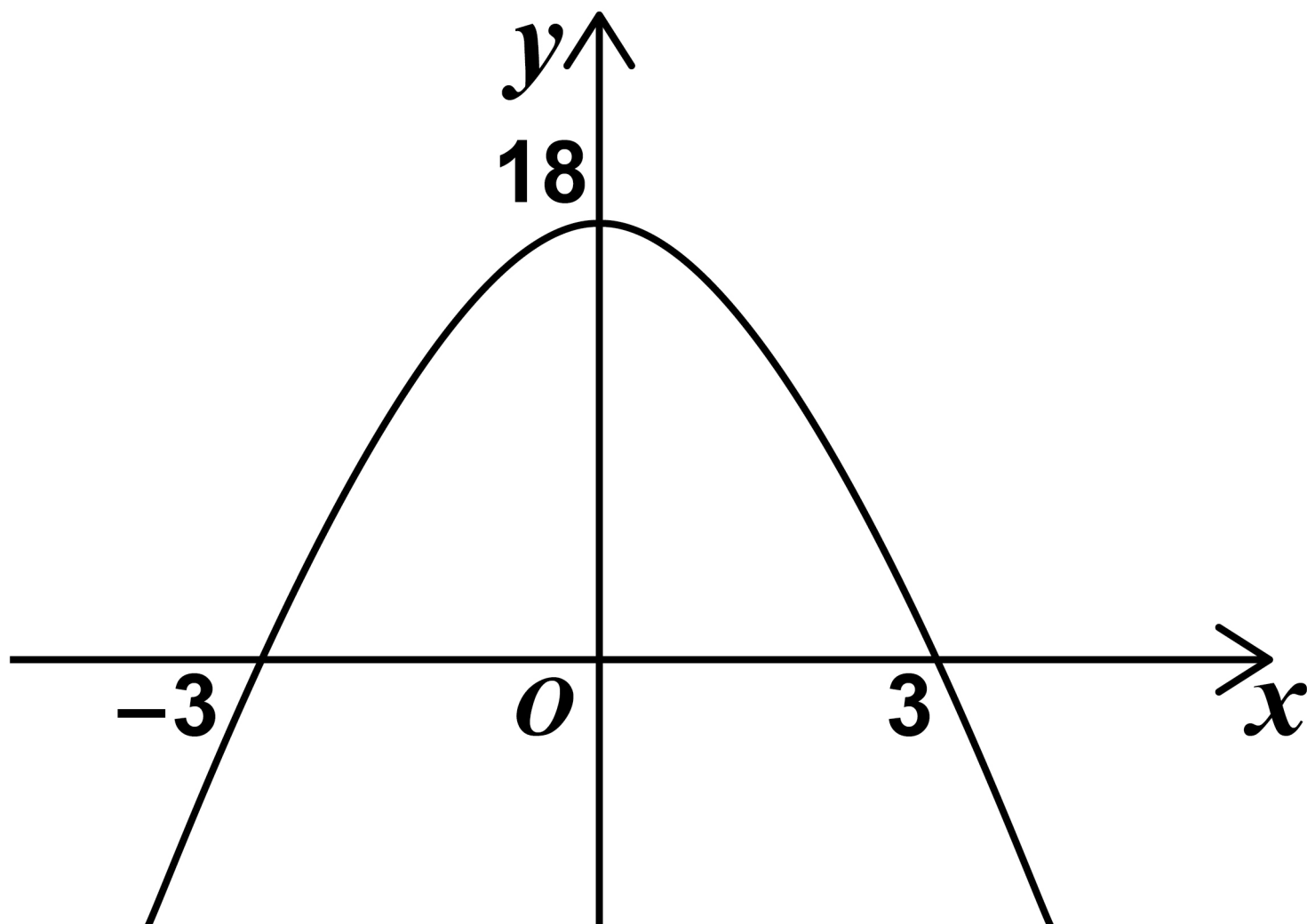
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[Turn over]

25 **A quadratic curve intersects the axes at (–3, 0), (3, 0) and (0, 18)**

The diagram is not drawn accurately.

Work out the equation of the curve.   [3 marks]

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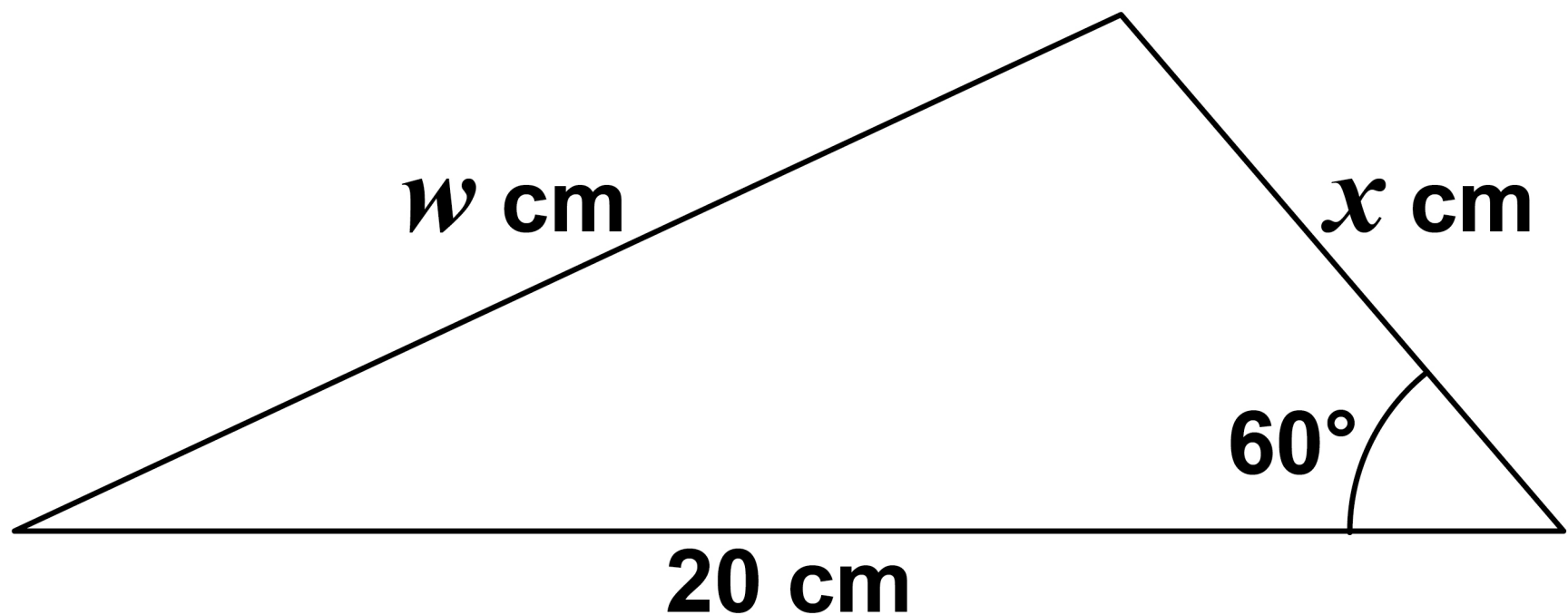**Answer** _____

[Turn over]

$\overline{6}$

26 **The area of this triangle is $25\sqrt{3}$ cm^2**

The diagram is not drawn accurately.

Work out the value of w.

Give your answer in the form $a\sqrt{b}$ where a and b are integers greater than 1 [5 marks]

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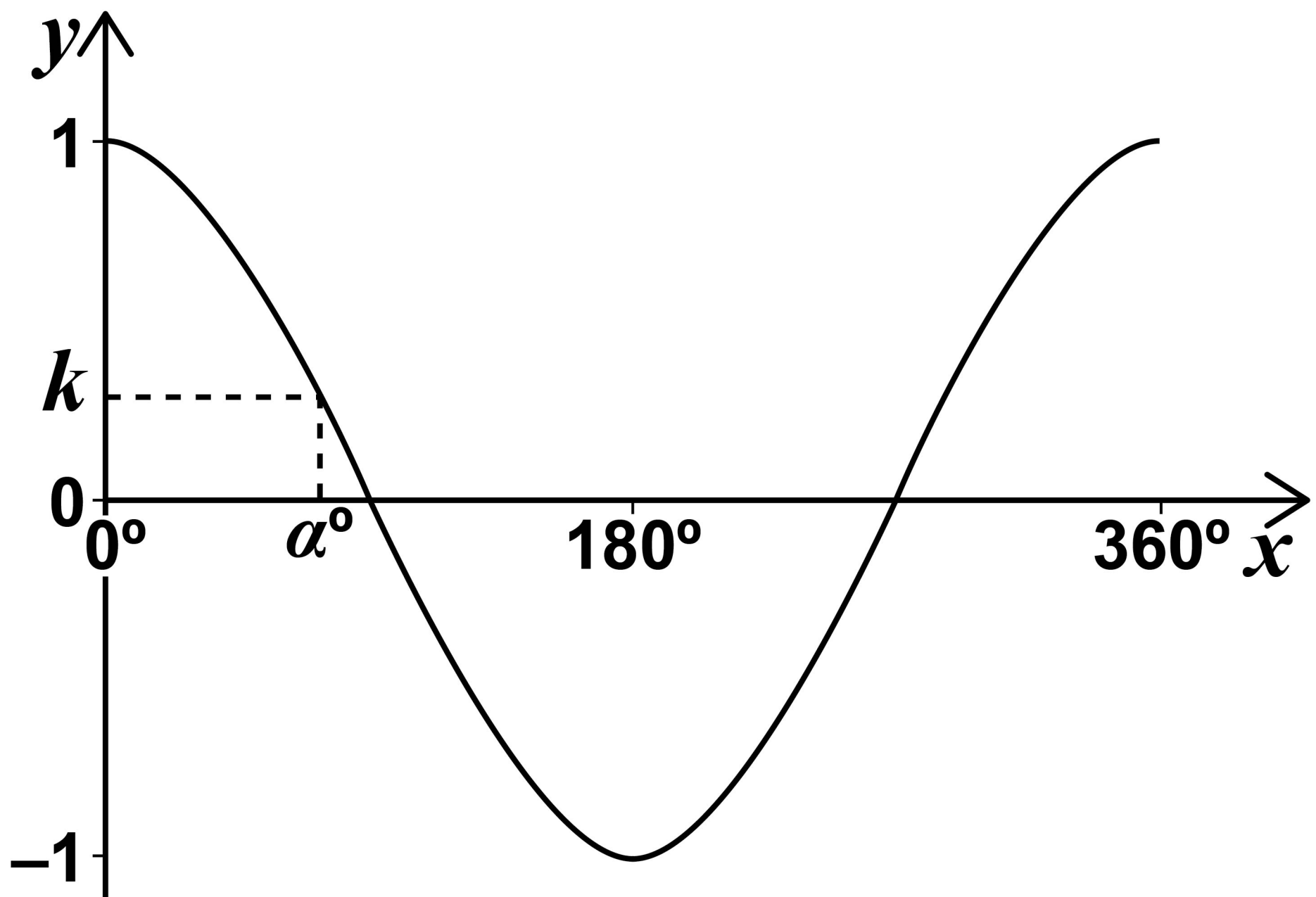_____

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Answer _____

[Turn over]

27 **Here is a sketch of** $y = \cos x$ **for values of x from 0° to 360°**

The diagram is not drawn accurately.

$\alpha°$ **is an acute angle.**

cos $\alpha° = k$

27 (a) Circle the value of cos (180° − a°)
[1 mark]

1 − k k −k −1 − k

27 (b) Circle the value of cos (360° + a°)
[1 mark]

k − 1 k + 1   −k k

END OF QUESTIONS

$$\boxed{\overline{7}}$$

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There are no questions printed on this page

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