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

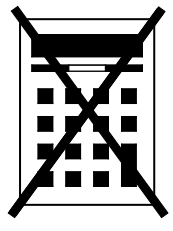
At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

N0V1883001H01

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.**

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

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

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

Circle your answer. [1 mark]

$22a$ $8a$ $38a$ $2a$

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

$\frac{1}{2}$ $\frac{\sqrt{3}}{2}$ 0 1

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

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

Answer _____

[Turn over]

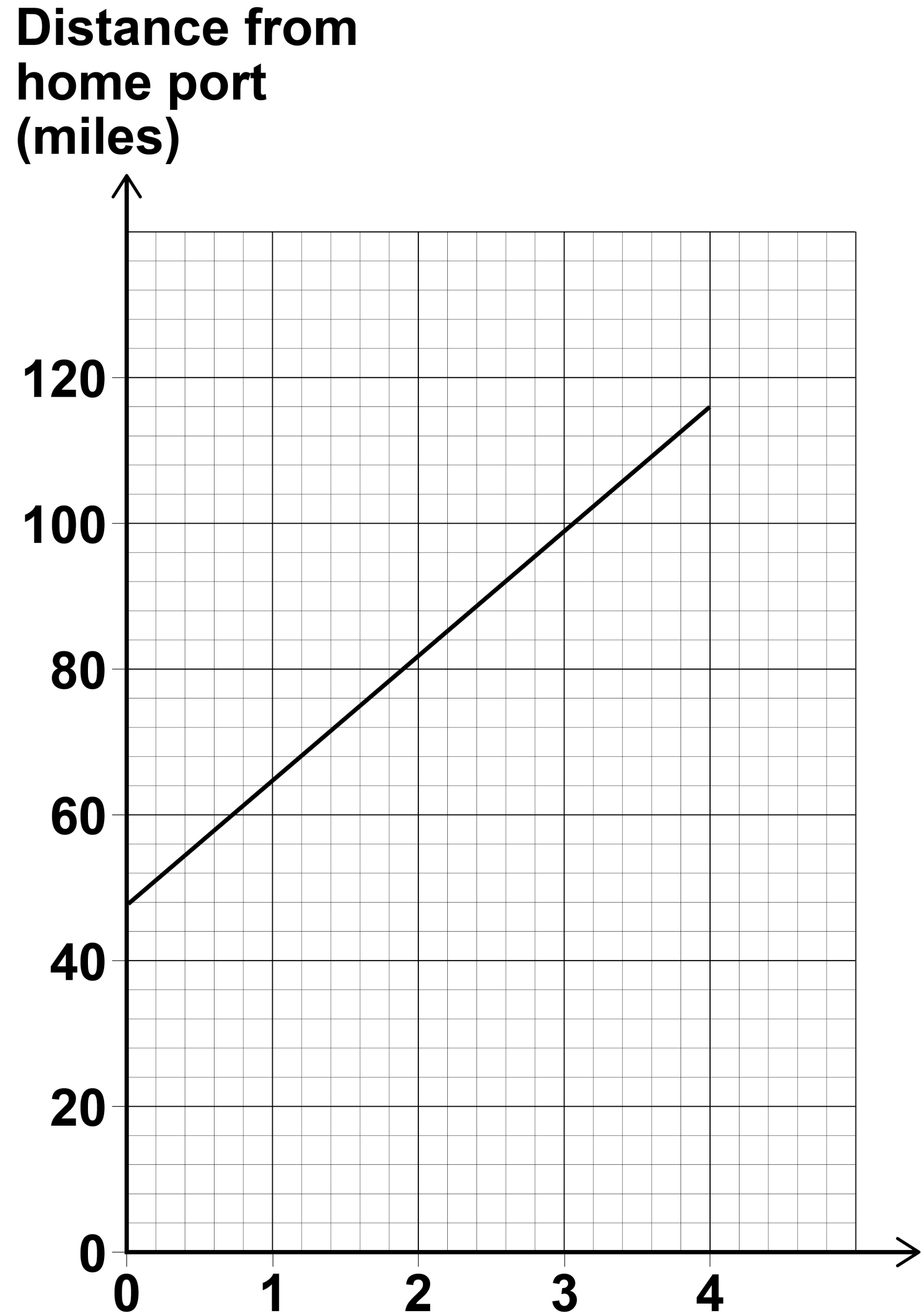
8

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]

Answer _____ mph


Distance from home port (miles)
120
100
80
60
40
20
0
0
1
2
3
4
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]

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 _____

_____

_____

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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]

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

Give a reason for your answer.
[2 marks]

_____

_____

_____

_____

_____

6

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

Work out the value of a. [4 marks]

Answer

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

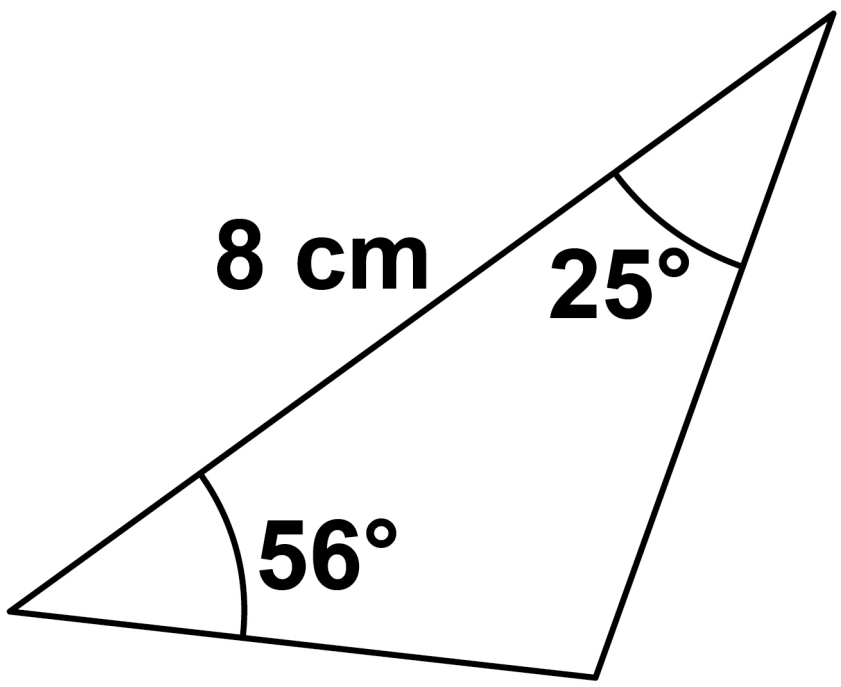
Answer _____ **%**

[Turn over]

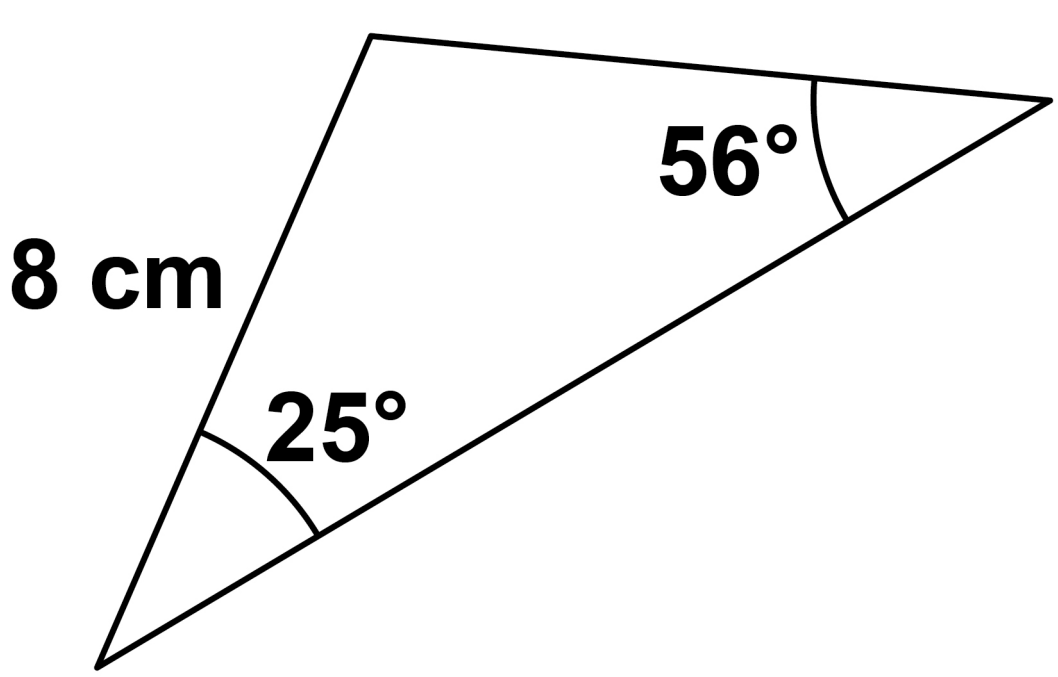
11 Here are four triangles.

The diagrams are not drawn accurately.

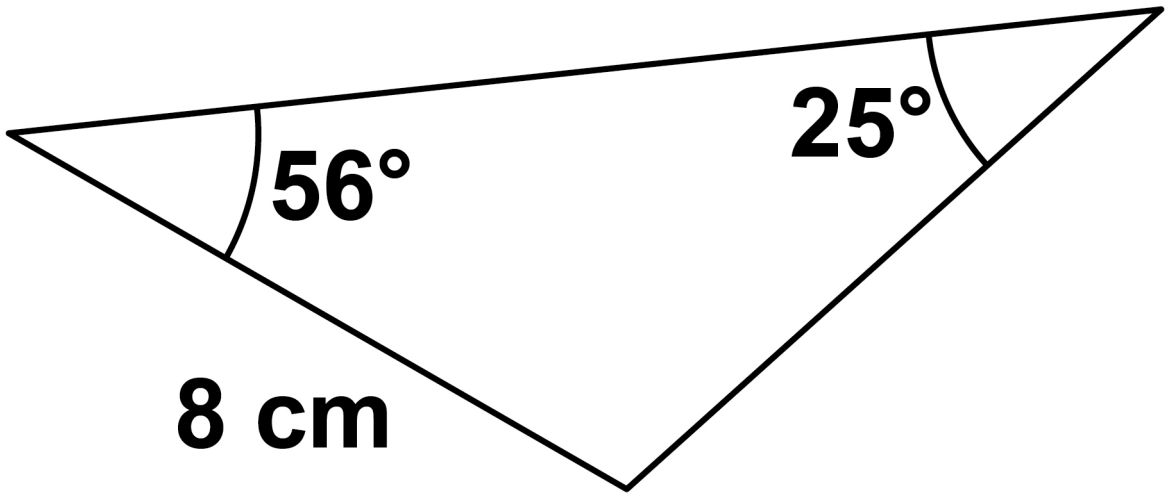
A



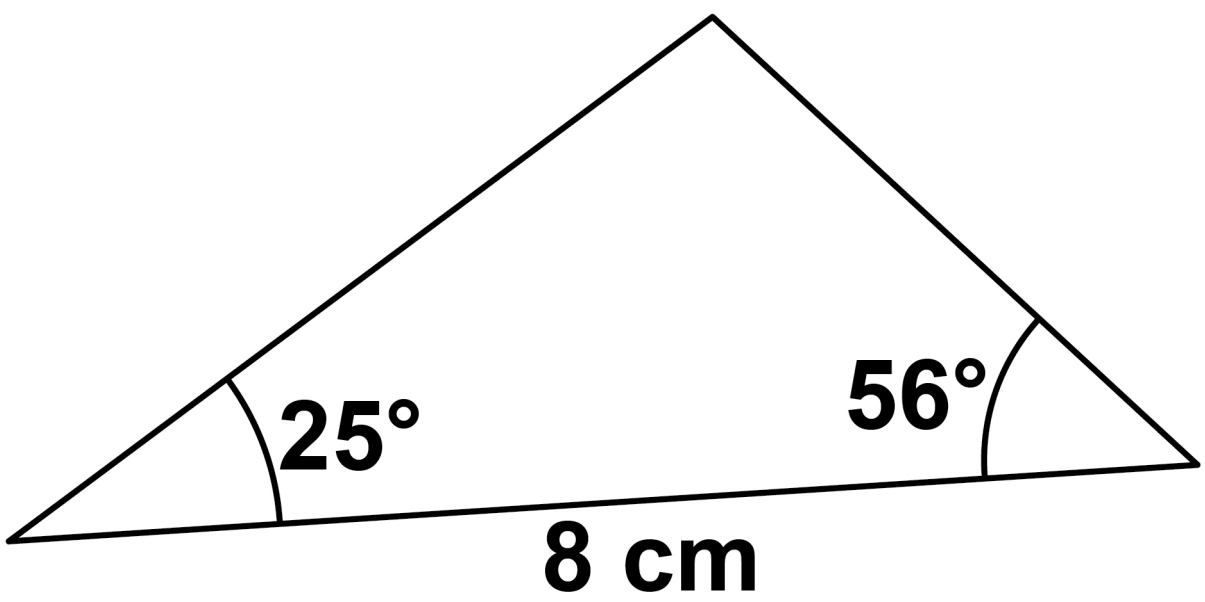
B



C



D



Which TWO triangles are congruent?

Circle TWO letters below. [1 mark]

A B C D

8

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

Answer

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

Work out $e : g$

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

Answer _____ : _____

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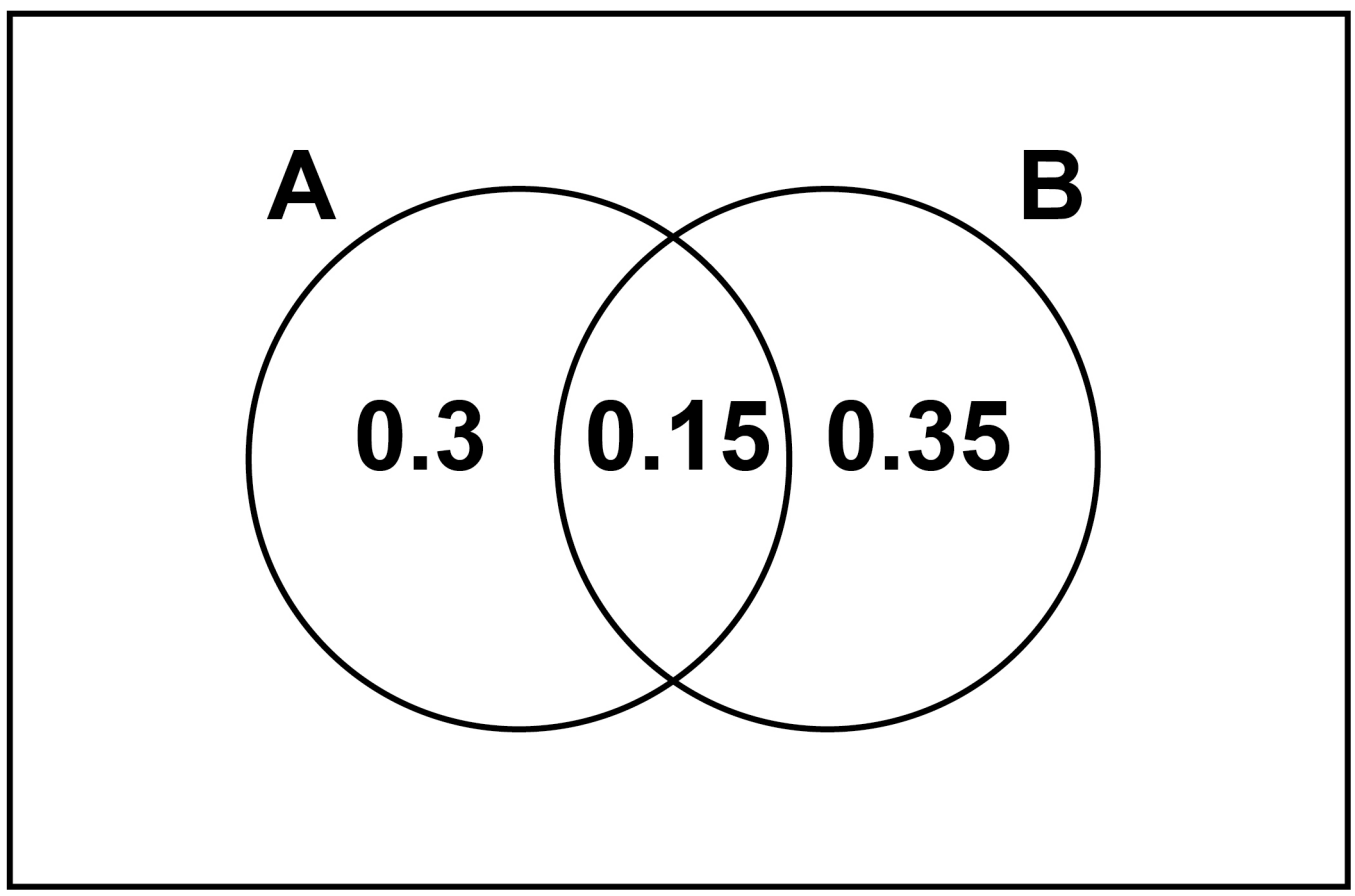
14 A and B are two events.

Some probabilities are shown on the Venn diagram.

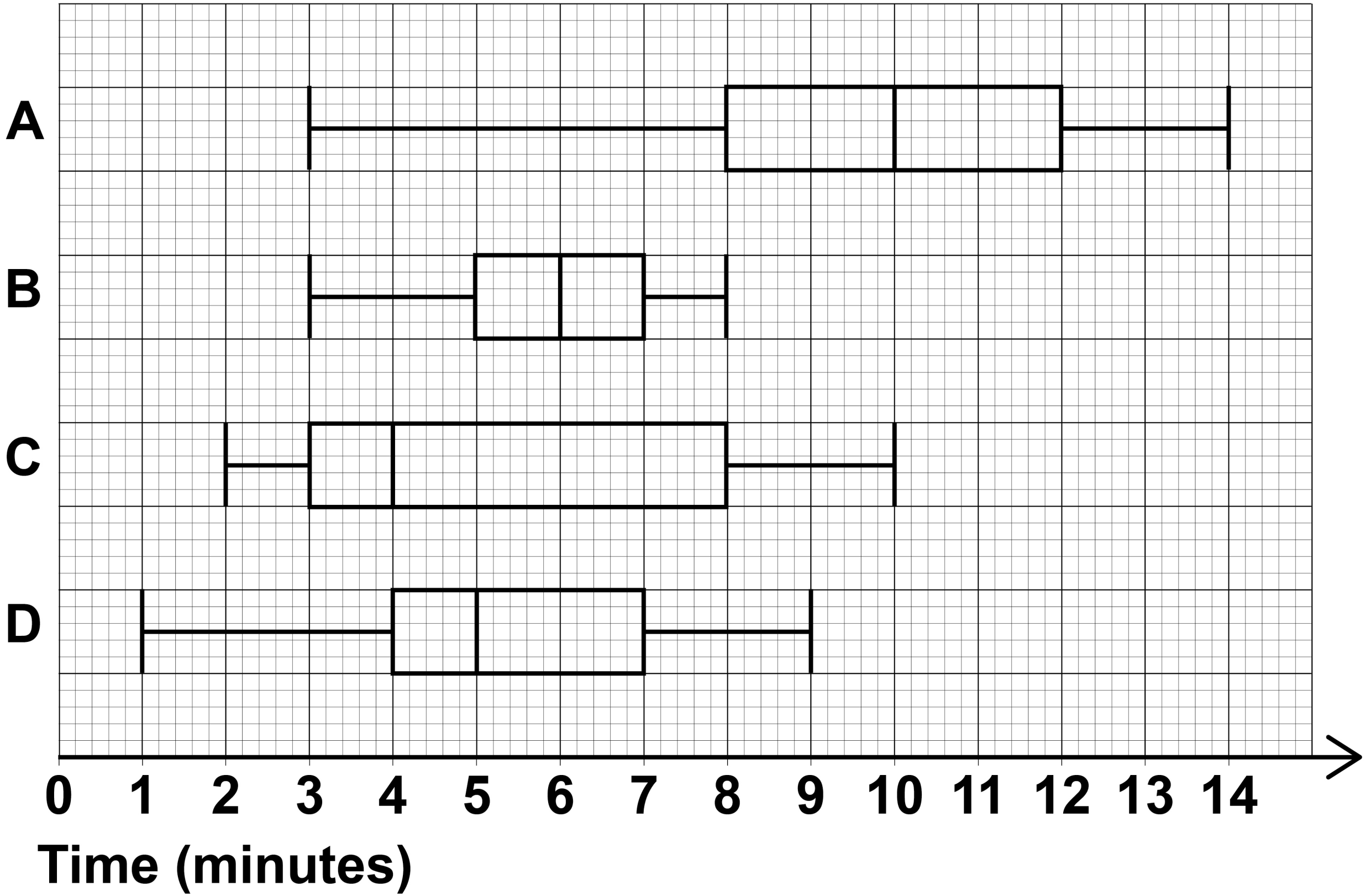


Work out $P(A' \cup B)$ [2 marks]

Answer _____

8

Queuing times



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?

Give a reason for your answer. [2 marks]

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 _____

_____

_____

[Turn over]

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]

Answer

7

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[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]

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]

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]

x = _____

y = _____

[Turn over]

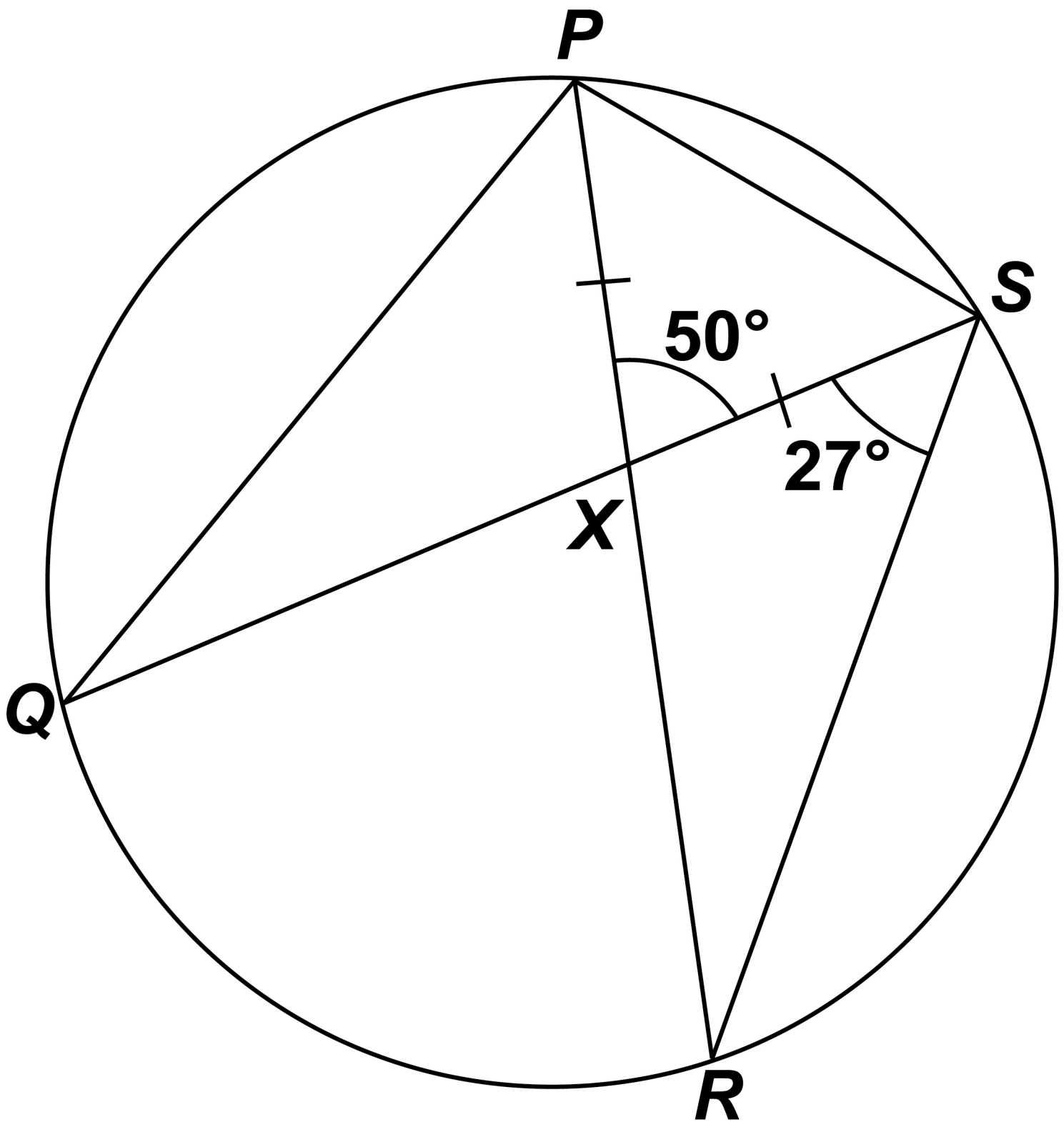
9

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.



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

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]

Answer

[Turn over]

7

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

You MUST show your working.
[4 marks]

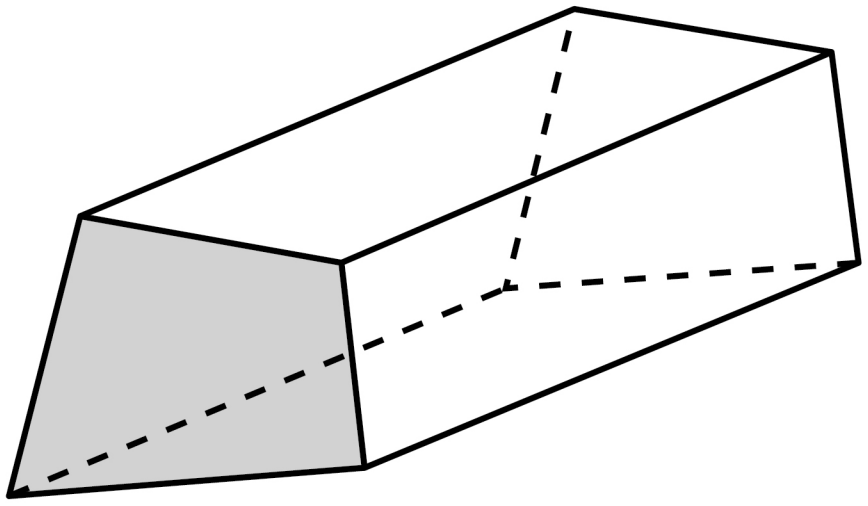
x =

[Turn over]

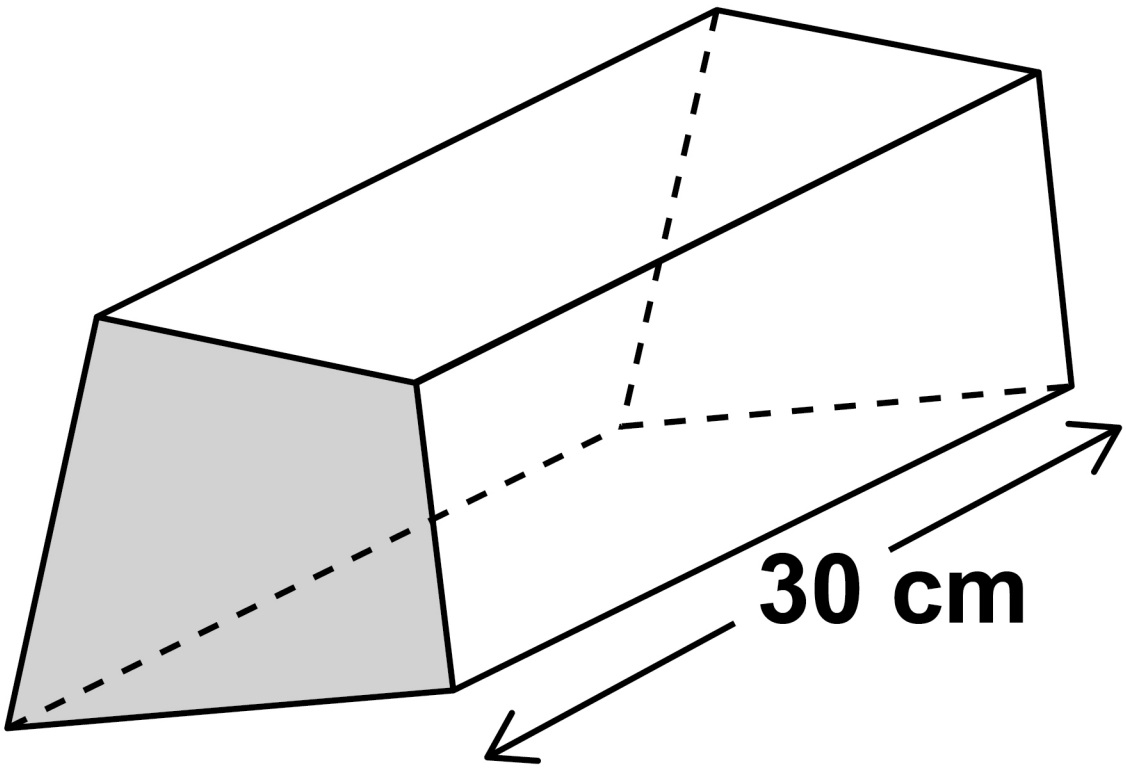
23 Prisms A and B are similar.

The cross sections are shaded.

Prism A
volume = 480 cm^3



Prism B
volume = 30 cm



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]

Answer _____ cm^2

9

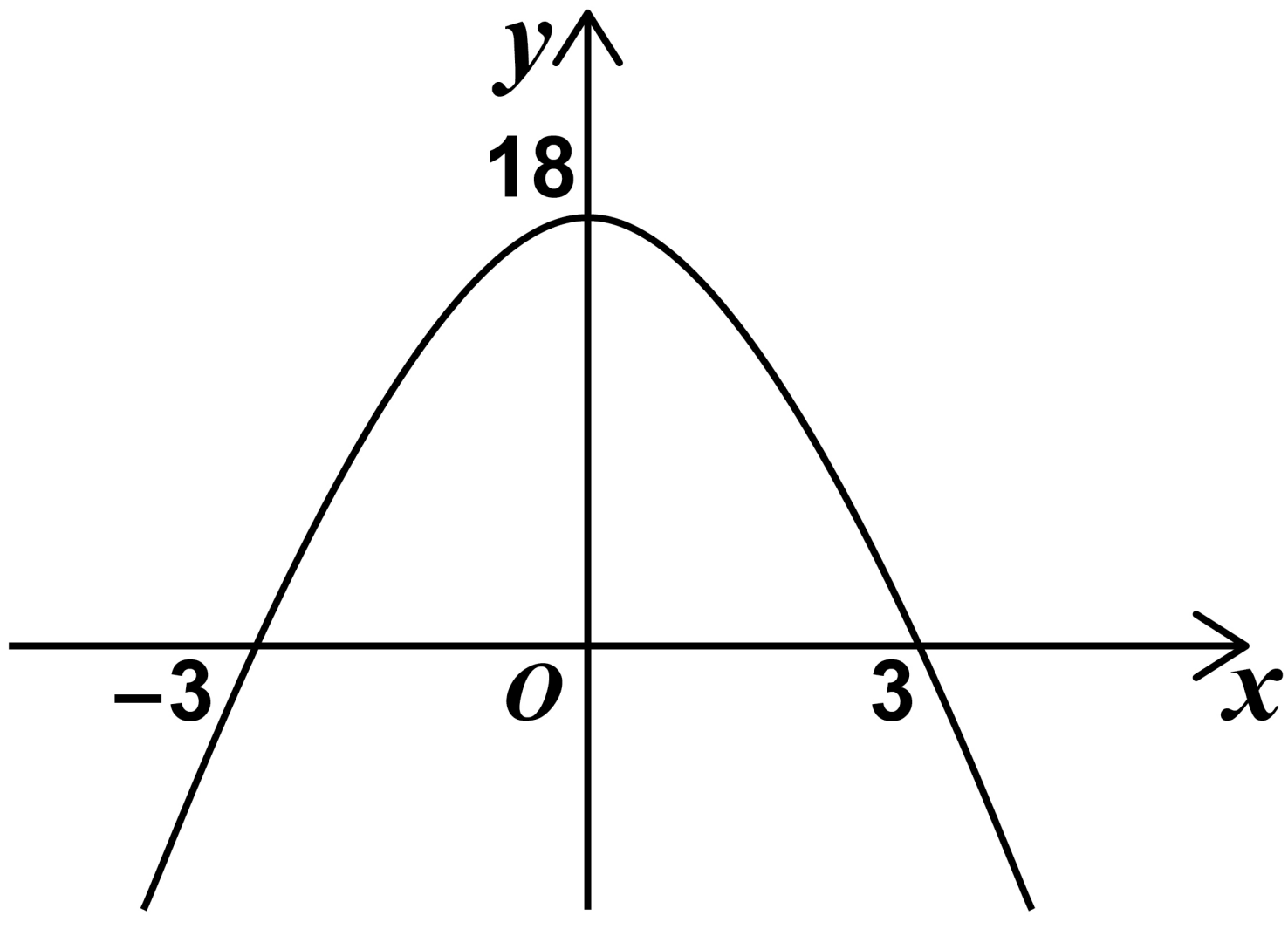
24 Show that $\frac{2\sqrt{6}}{\sqrt{5}} - \frac{\sqrt{3}}{\sqrt{10}}$ can be written

in the form $\frac{c\sqrt{d}}{10}$ where c and d are integers. [3 marks]

[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]

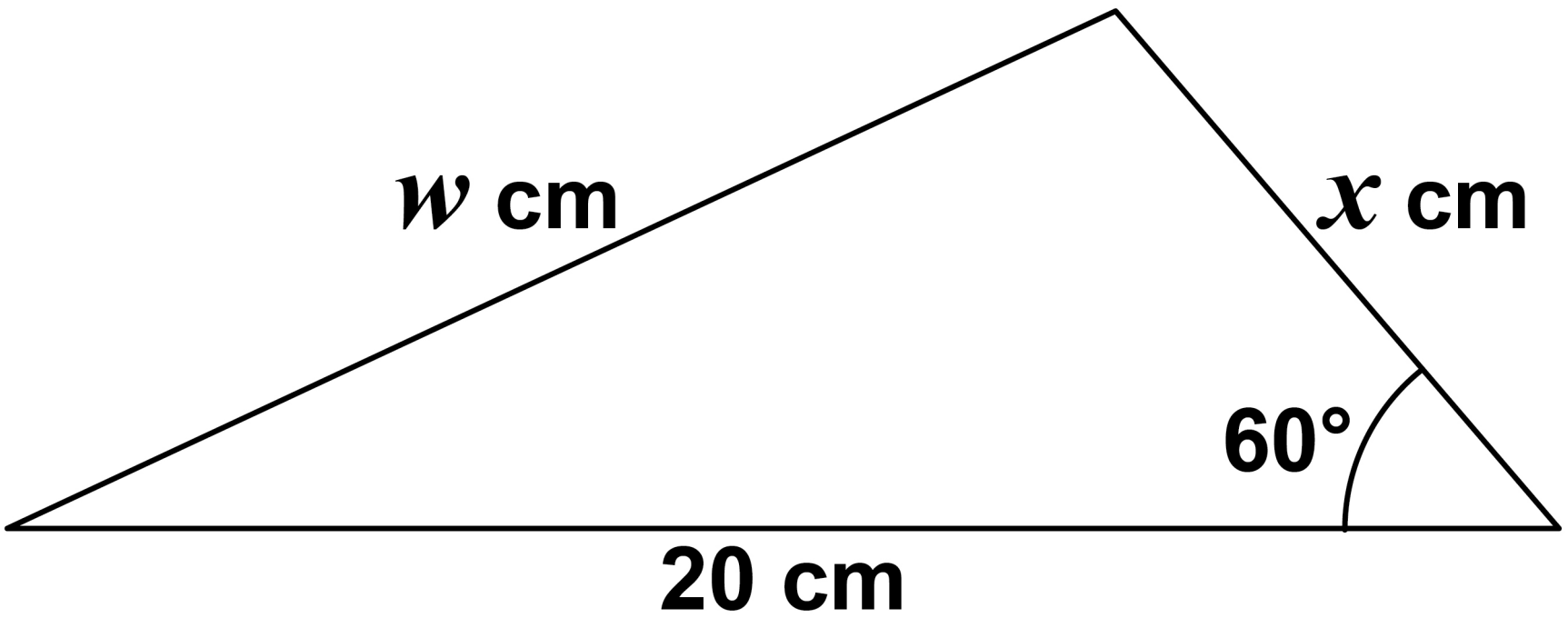
Answer _____

[Turn over]

6

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

The diagram is not drawn accurately.



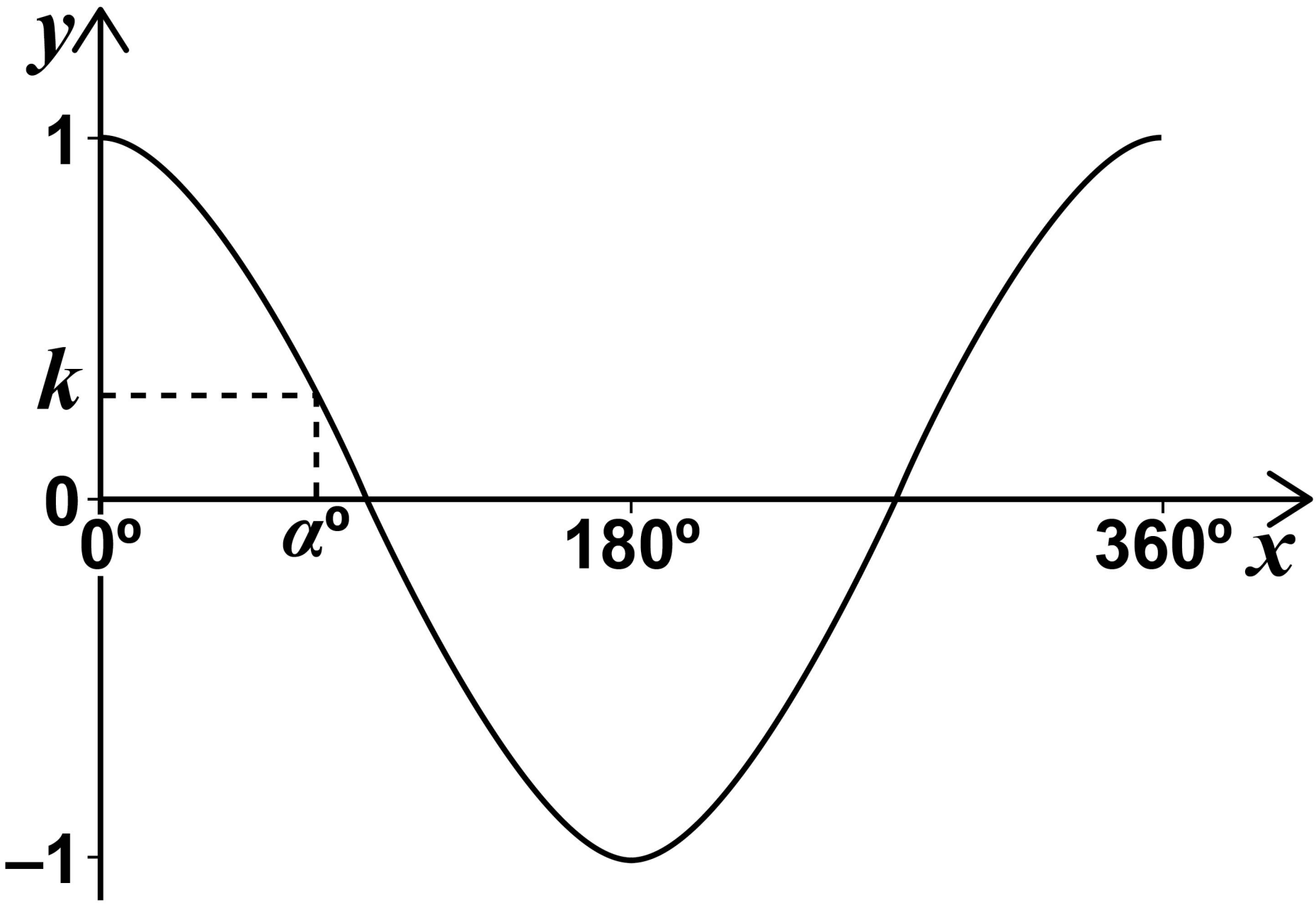
Work out the value of w.

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

Answer

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

The diagram is not drawn accurately.



αº is an acute angle.

cos αº = k

27 (a) Circle the value of $\cos(180° - \alpha°)$ [1 mark]

$1 - k$ $\quad$ k $\quad$ $-k$ $\quad$ $-1 - k$

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

$k - 1$ $\quad$ $k + 1$ $\quad$ $-k$ $\quad$ k

END OF QUESTIONS

7

There are no questions printed on this page

For Examiner's Use	
Pages	Mark
4–7	
8–11	
12–17	
18–21	
22–25	
26–30	
31–35	
36–39	
40–43	
44–47	
48–51	
TOTAL	