z

AQA

GCSE

MATHEMATICS

H

Higher Tier   Paper 1 Non-Calculator

8300/1H

Tuesday 6 November 2018   Morning

Time allowed: 1 hour 30 minutes

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

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

[Turn over]

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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 $\qquad$ 5^8 $\qquad$ 25^6 $\qquad$ 25^8

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

40π $\qquad$ 80π $\qquad$ 200π $\qquad$ 1600π

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

Circle your answer. [1 mark]

$22a$ $\qquad$ $8a$ $\qquad$ $38a$ $\qquad$ $2a$

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

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

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

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

Answer _____

8

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

The distance-time graph shows 4 hours of the journey.

Distance from home port (miles)

Time (hours)
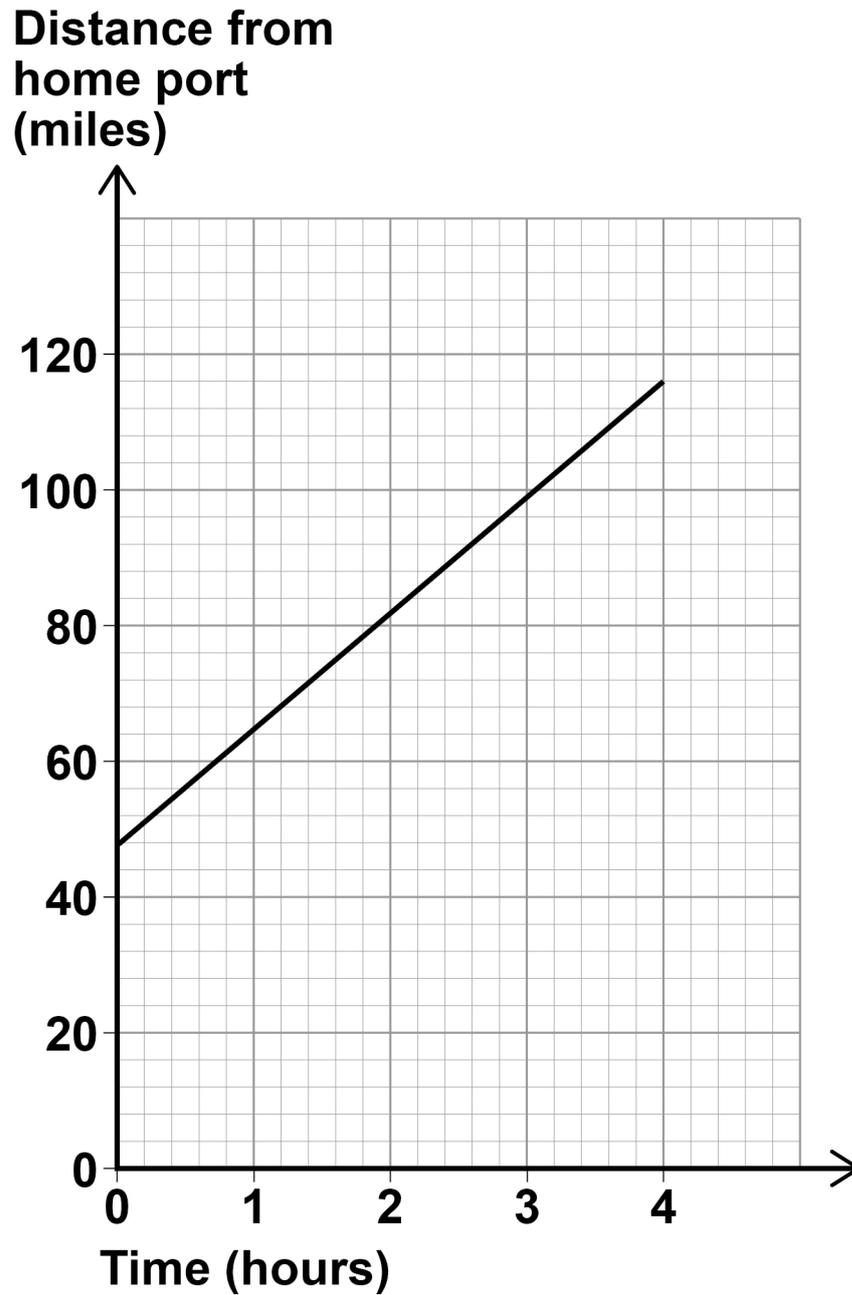
Work out the speed of the ship during these 4 hours. [3 marks]

_____

_____

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Answer _____ **mph**

[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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5

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[Turn over]

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 _____

_____

_____

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 _____

[Turn over]

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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
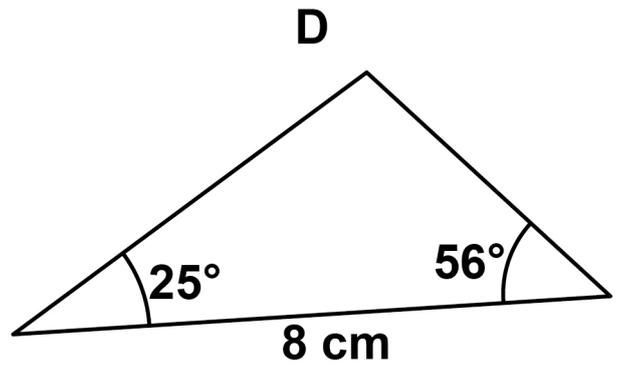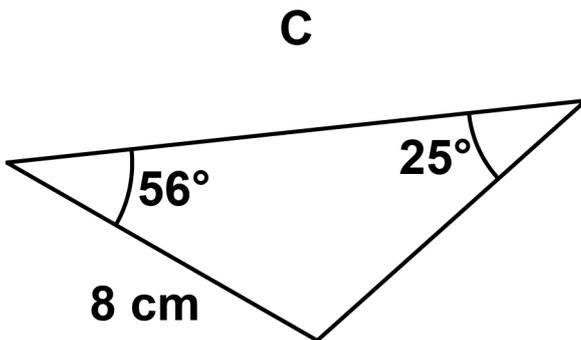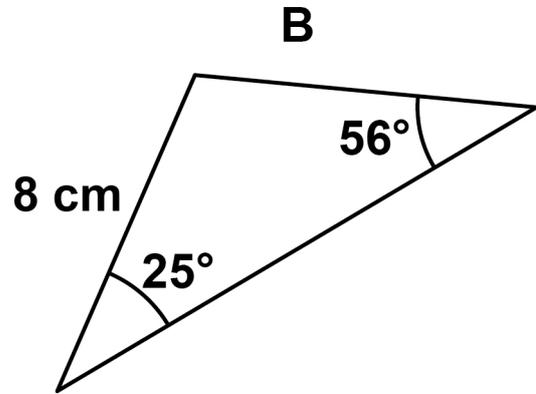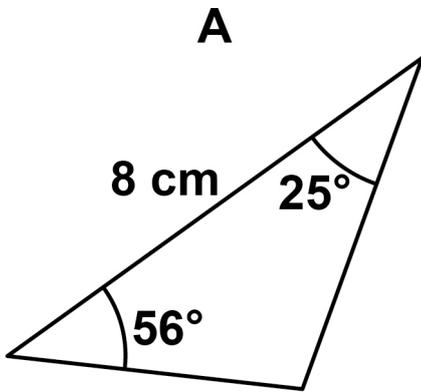
Give a reason for your answer. [2 marks]

_____

_____

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6

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

Work out the value of a. [4 marks]

_____

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Answer _____

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

_____

_____

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_____

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_____

_____

Answer _____ **%**

[Turn over]

11 Here are four triangles.

The diagrams are not drawn accurately.

A
8 cm 25°
56°

B
8 cm 56°
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

8

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

Answer _____

[Turn over]

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

Work out $e : g$

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

Answer _____ : _____

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

Some probabilities are shown on the Venn diagram.

ξ
A   B

0.3 (0.15) 0.35
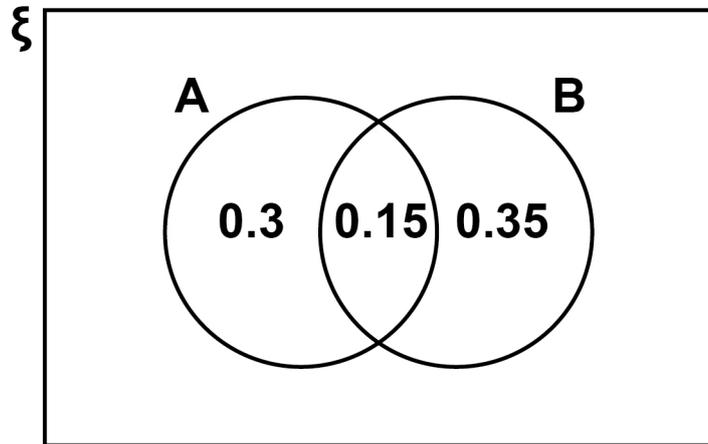
Work out   P(A' U B)   [2 marks]

_____

_____

_____

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_____

Answer _____

[Turn over]

8

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 represent the results.

Queuing times

Time (minutes)
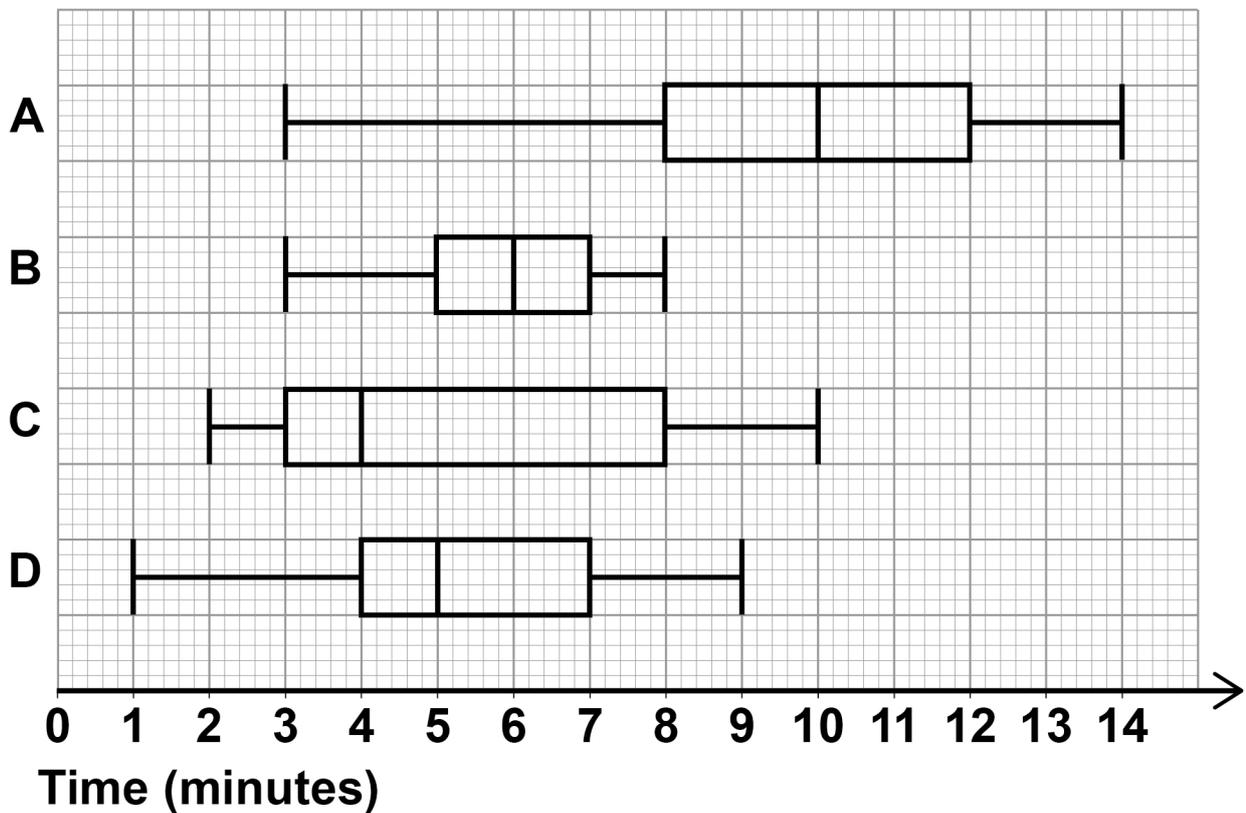
15 (a) On average, which supermarket had the lowest queuing times?

Give a reason for your answer. [2 marks]

Supermarket _____

Reason _____

_____

_____

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 $\left(\dfrac{3}{4}\right)^{-3}$ [2 marks]

_____

_____

_____

_____

Answer _____

7

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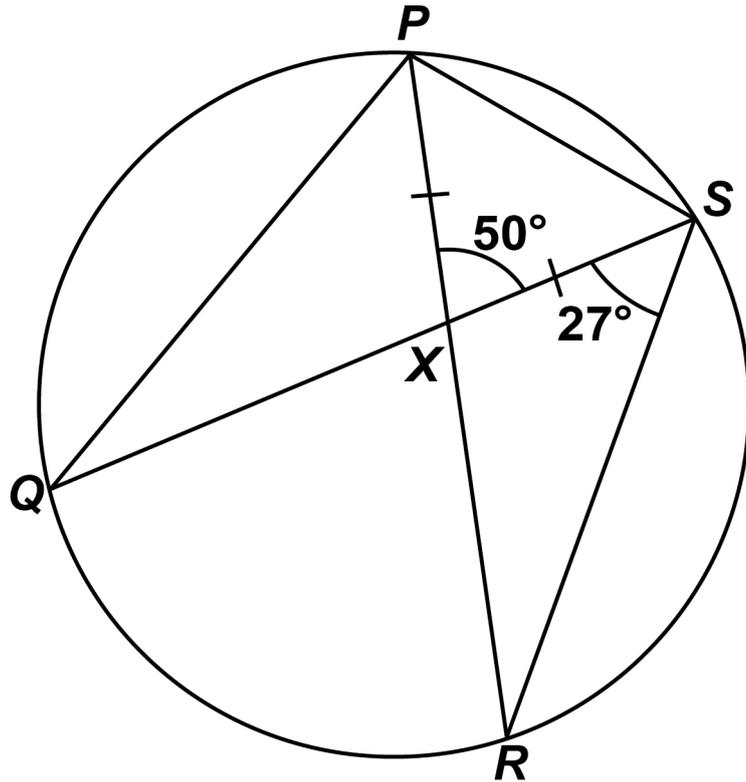
Show that $y = 2x + 2$ [2 marks]

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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]

$x =$ _____

$y =$ _____

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]

_____

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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 _____

7

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

You MUST show your working. [4 marks]

_____

_____

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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
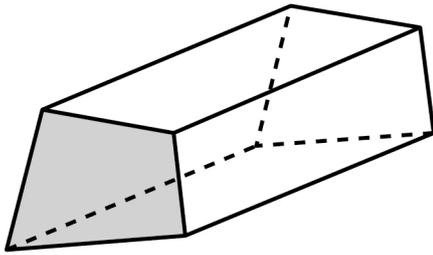
Prism B
length = 30 cm

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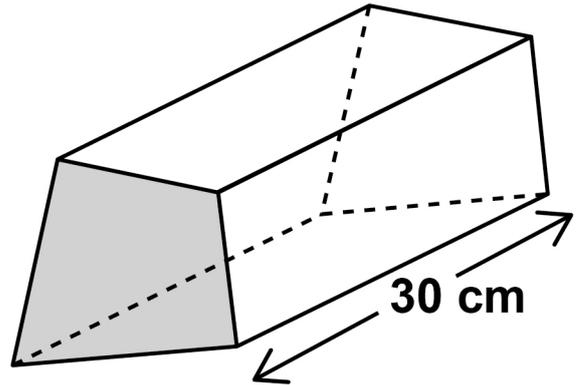
area of the cross section of A : area of the cross section of B = 4 : 9

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

_____

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Answer _____ **cm^2**

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]

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

The diagram is not drawn accurately.
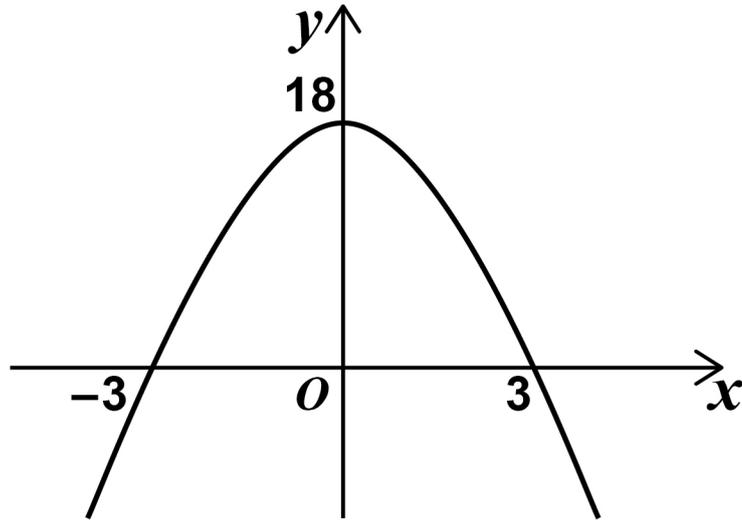
Work out the equation of the curve. [3 marks]

_____

_____

_____

_____

_____

_____

Answer

6

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

The diagram is not drawn accurately.
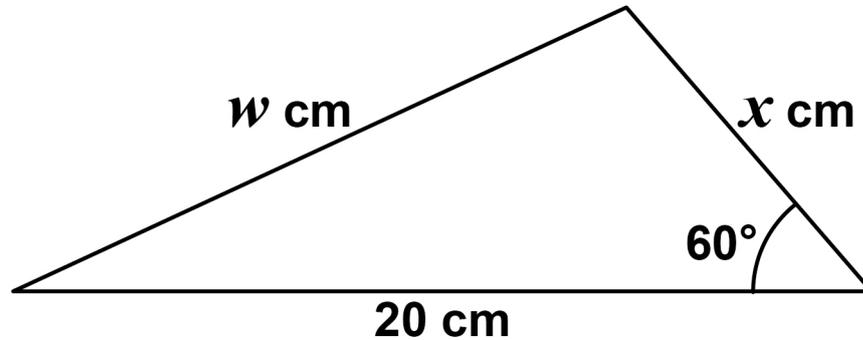
Work out the value of w.

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

Answer

[Turn over]

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

The diagram is not drawn accurately.
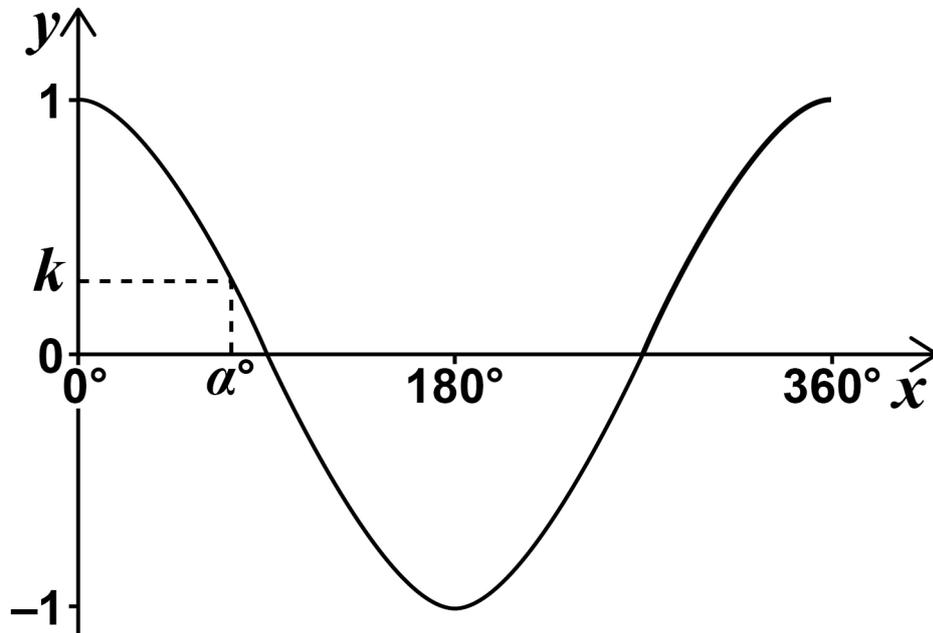
αº is an acute angle.

$\cos \alpha$º = k

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

$1 - k$ $\qquad$ k $\qquad$ $-k$ $\qquad$ $-1 - k$

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

$k - 1$ $\qquad$ $k + 1$ $\qquad$ $-k$ $\qquad$ k

END OF QUESTIONS

7

There are no questions printed on this page

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