z

AQA

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

GCSE

MATHEMATICS

H

Higher Tier Paper 1 Non-Calculator

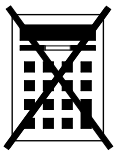
8300/1H

Tuesday 6 November 2018 Morning

Time allowed: 1 hour 30 minutes

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 $(5^4)^2$

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

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

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

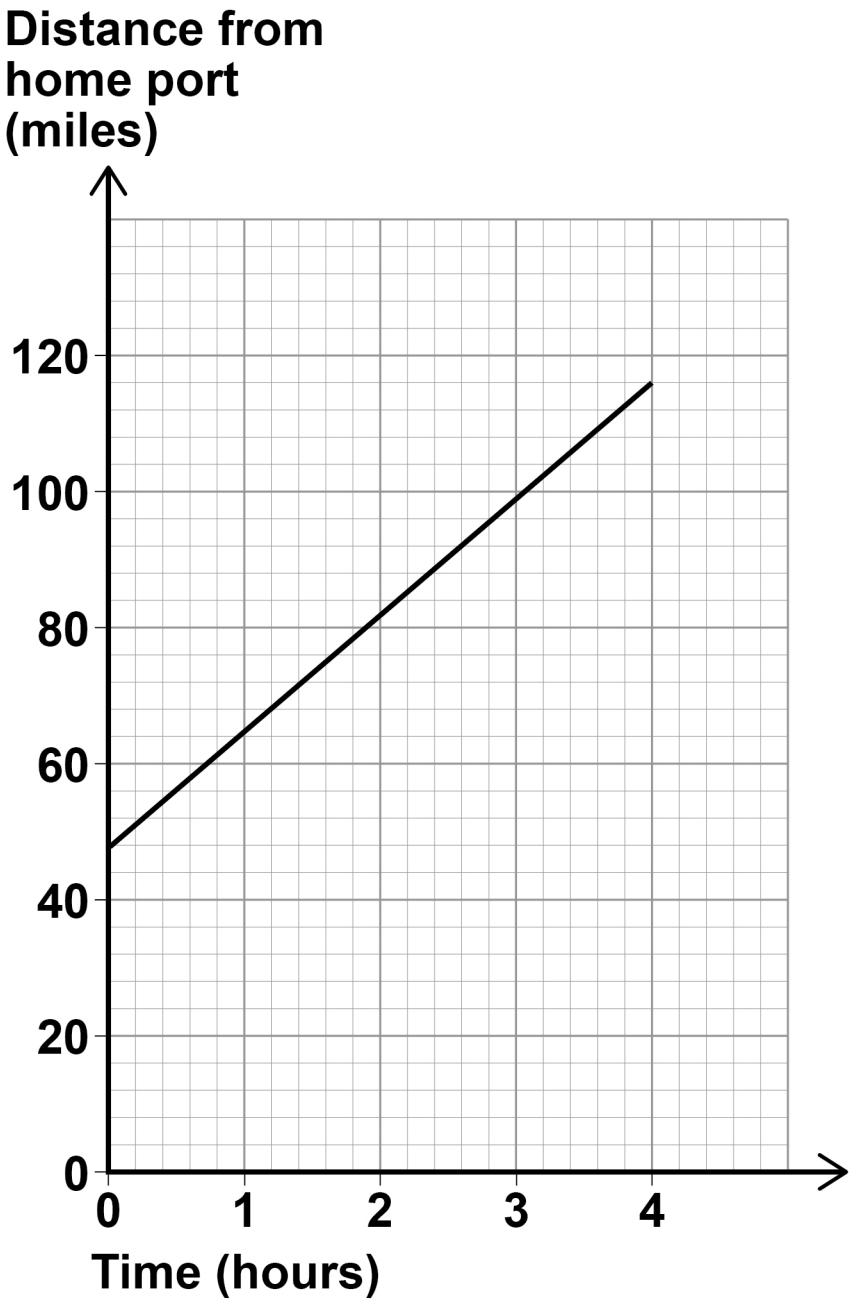
Answer _____

[Turn over]

8

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

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



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

Answer _____ **mph**

[Turn over]

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

For example, in a rectangle $4 \times 90º = 360º$

Zak writes,

$5 \times 90º = 450º$ 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

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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]

Answer _____

[Turn over]

BLANK PAGE

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]

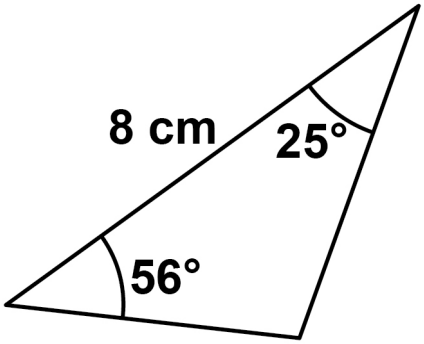
Answer _____ **%**

[Turn over]

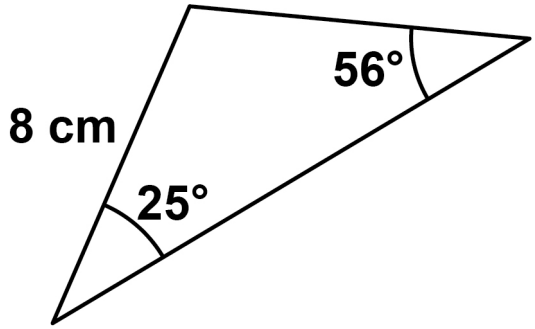
11 Here are four triangles.

The diagrams are not drawn accurately.

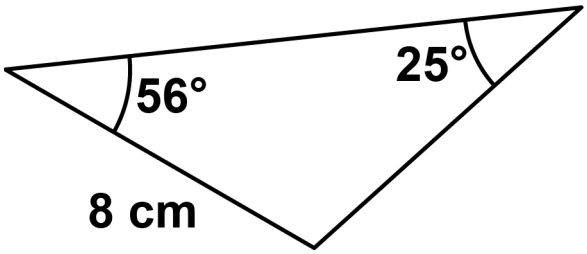
A



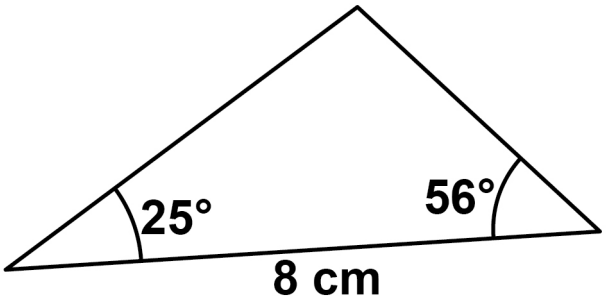
B



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 $f : g = 5 : 4$

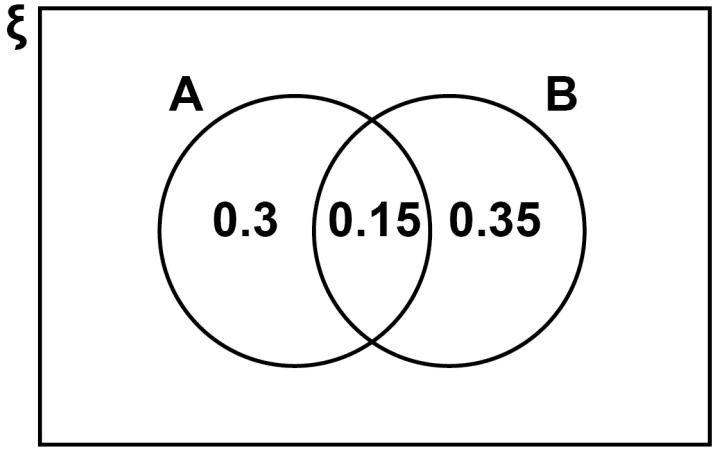
Work out $e : g$

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

Answer _____ : _____

14 A and B are two events.

Some probabilities are shown on the Venn diagram.



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

Answer _____

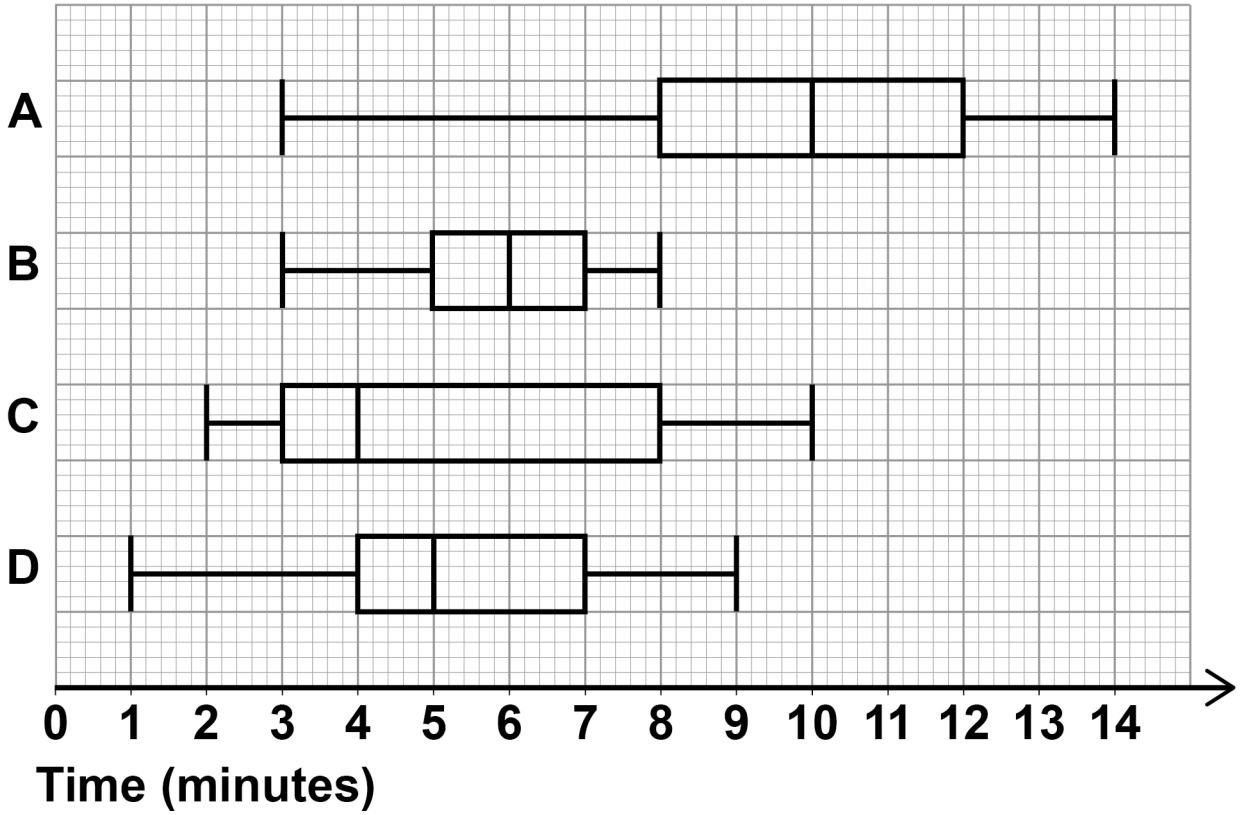
8

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



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

Answer _____ **days**

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 = _____

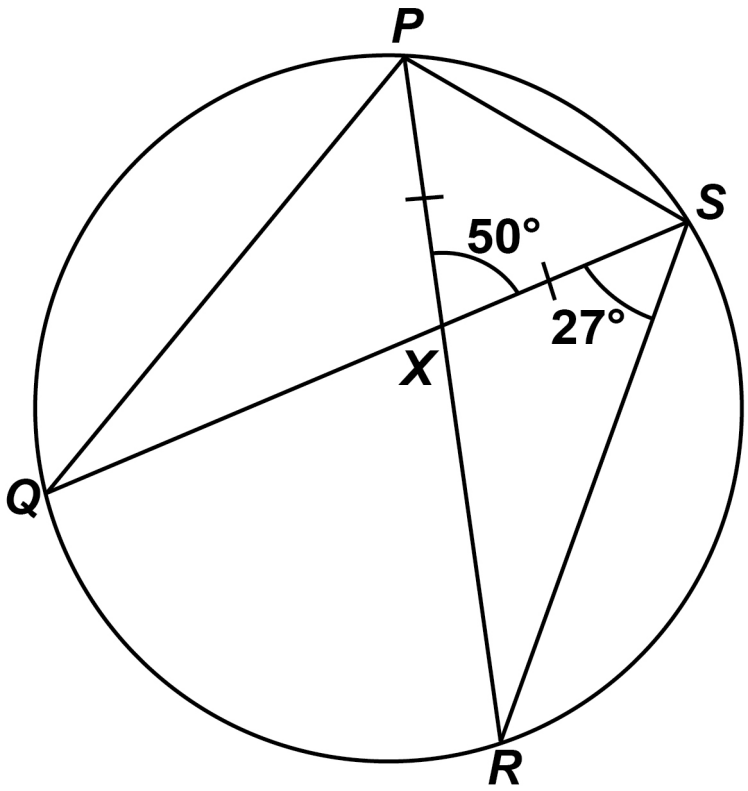
9

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]

[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]

Answer _____

7

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

You MUST show your working. [4 marks]

x = _____

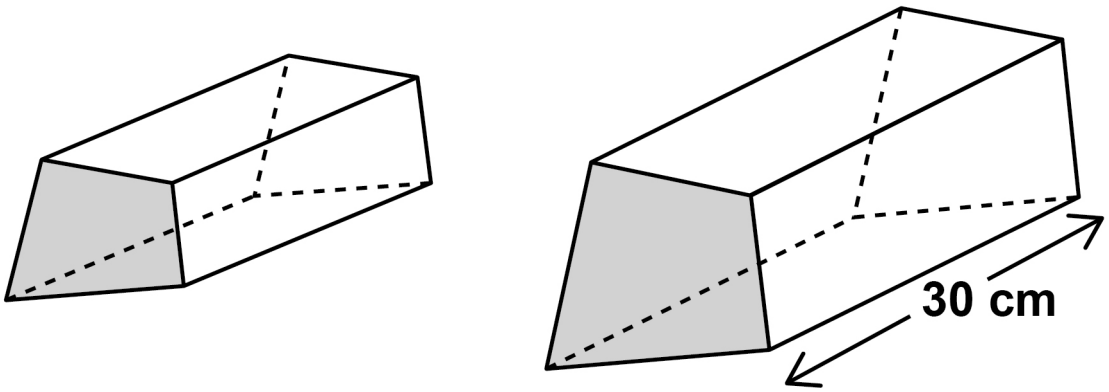
[Turn over]

23 Prisms A and B are similar.

The cross sections are shaded.

Prism A
volume = 480 cm^3

Prism B
length = 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

[Turn over]

9

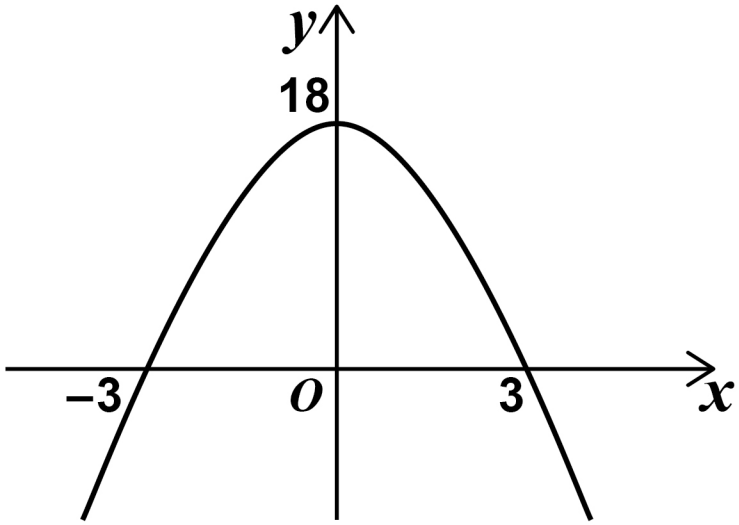
24 Show that $\frac{2\sqrt{6}}{\sqrt{5}} - \frac{\sqrt{3}}{\sqrt{10}}$ can be written in the form $\frac{c\sqrt{d}}{10}$ where c and d are integers.

[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]

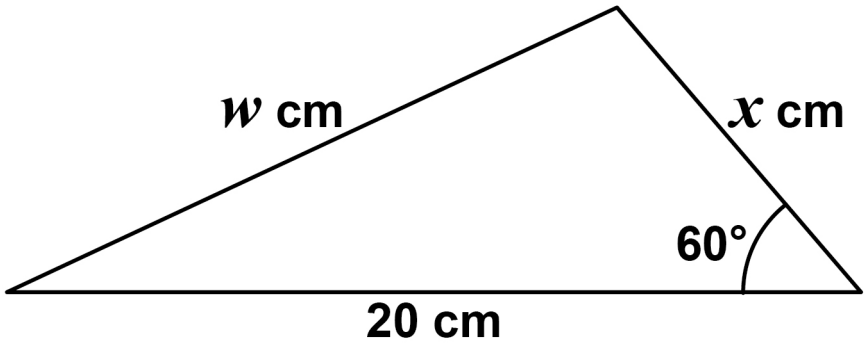
Answer _____

[Turn over]

6

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

The diagram is not drawn accurately.



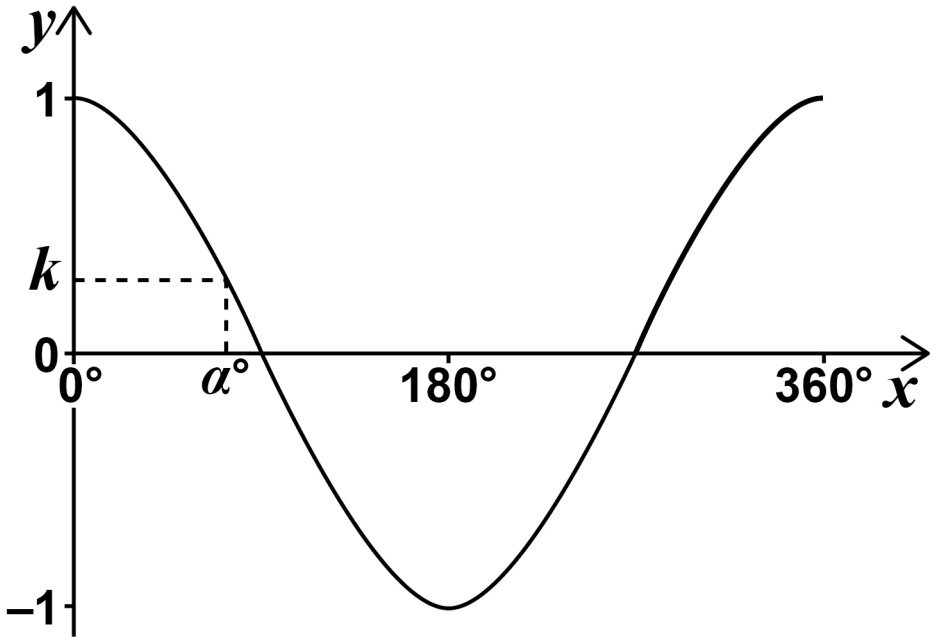
Work out the value of w.

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 0° to 360°

The diagram is not drawn accurately.



$\alpha°$ is an acute angle.

$\cos \alpha° = k$

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

$1 - k$ k $-k$ $-1 - k$

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

$k - 1$ $k + 1$ $-k$ k

END OF QUESTIONS

7

There are no questions printed on this page

For Examiner's Use	
Pages	Mark
4–5	
6–8	
10–13	
14–16	
17–19	
20–22	
22–25	
26–29	
30–33	
34–37	
38–41	
TOTAL	