Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

H

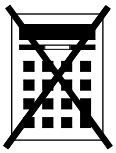
Higher Tier Paper 1 Non-Calculator

Tuesday 6 November 2018 Morning Time allowed: 1 hour 30 minutes

Materials

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.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or 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.

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
TOTAL	

Do not write outside the box

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]

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

Do not write outside the box

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 _____

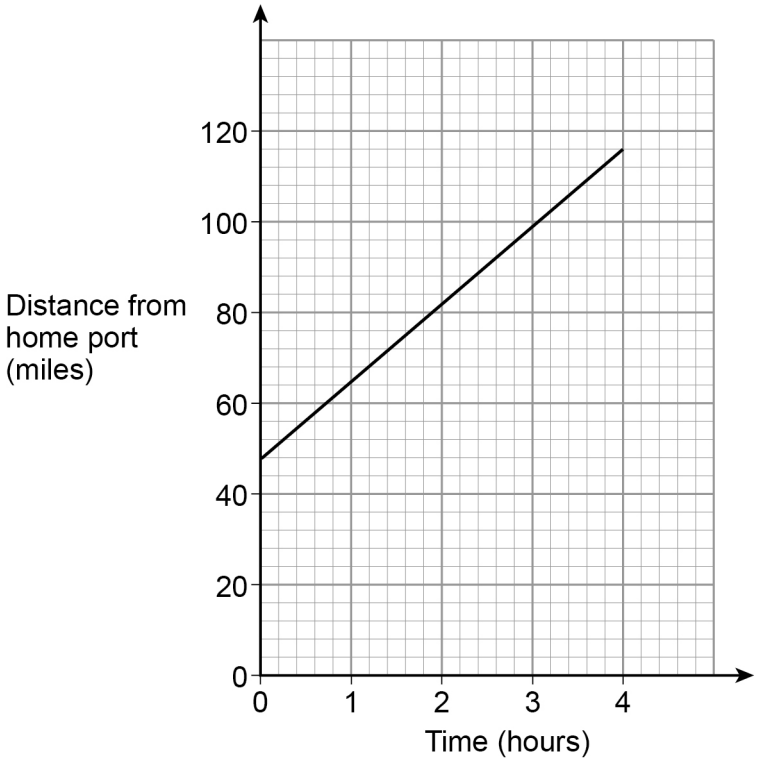
8

Turn over ►

Do not write outside the box

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

Do not write outside the box

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

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

Zak writes,

$5 \times 90° = 450°$ so the sum of the angles in any pentagon must be 450°

Is he correct?

Tick a box.

☐ Yes ☐ No

Show working to support your answer.

[2 marks]

Turn over for the next question

5

Do not write outside the box

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 table shows the data for the first 10 days in January.

Day	1	2	3	4	5	6	7	8	9	10
Number of planes	148	151	147	155	153	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 _____

Do not write outside the box

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]

_____

_____

_____

Turn over for the next question

6

Do not write outside the box

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

Work out the value of a.

[4 marks]

Answer _____

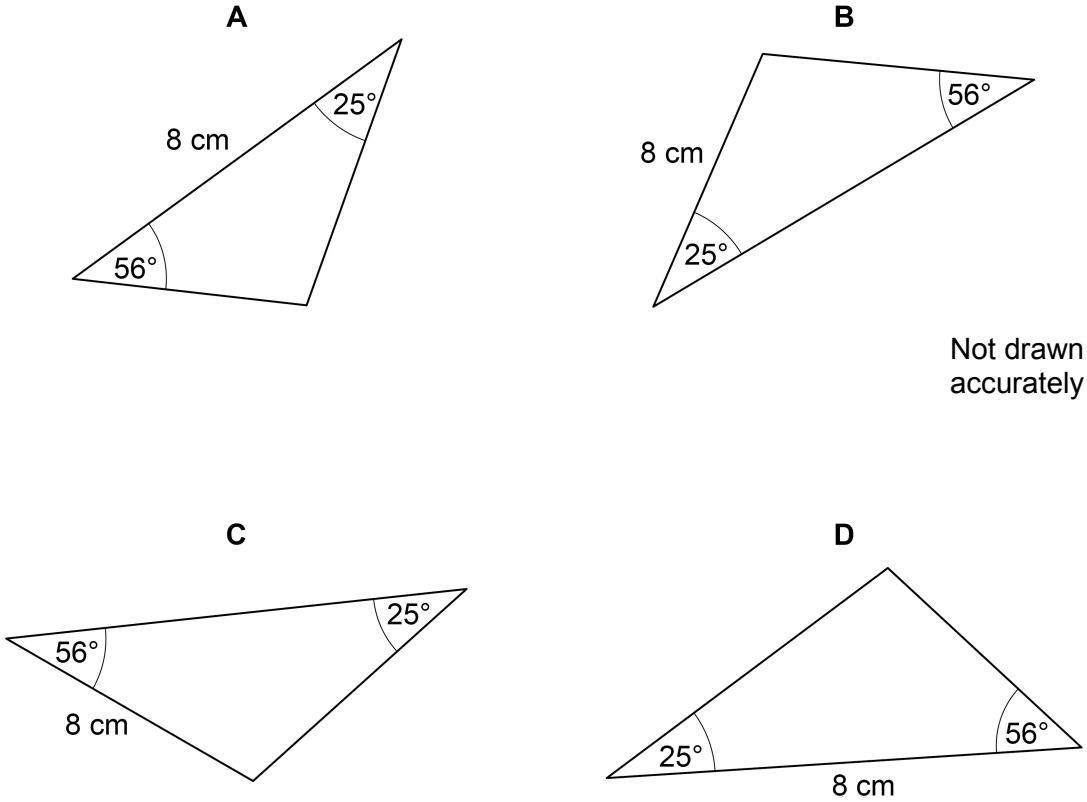
10 Work out the percentage increase from 80 to 280

[3 marks]

Answer _____ %

Do not write outside the box

11 Here are four triangles.



Which **two** triangles are congruent?

Circle **two** letters below.

[1 mark]

A B C D

Turn over for the next question

8

Do not write outside the box

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.

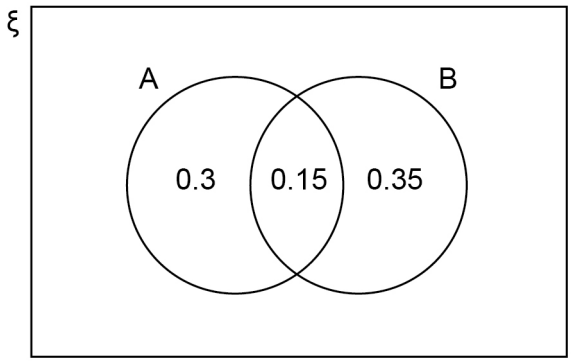
[3 marks]

Answer _____ : _____

Do not write outside the box

14 A and B are two events.

Some probabilities are shown on the Venn diagram.



Work out $P(A' \cup B)$

[2 marks]

Answer _____

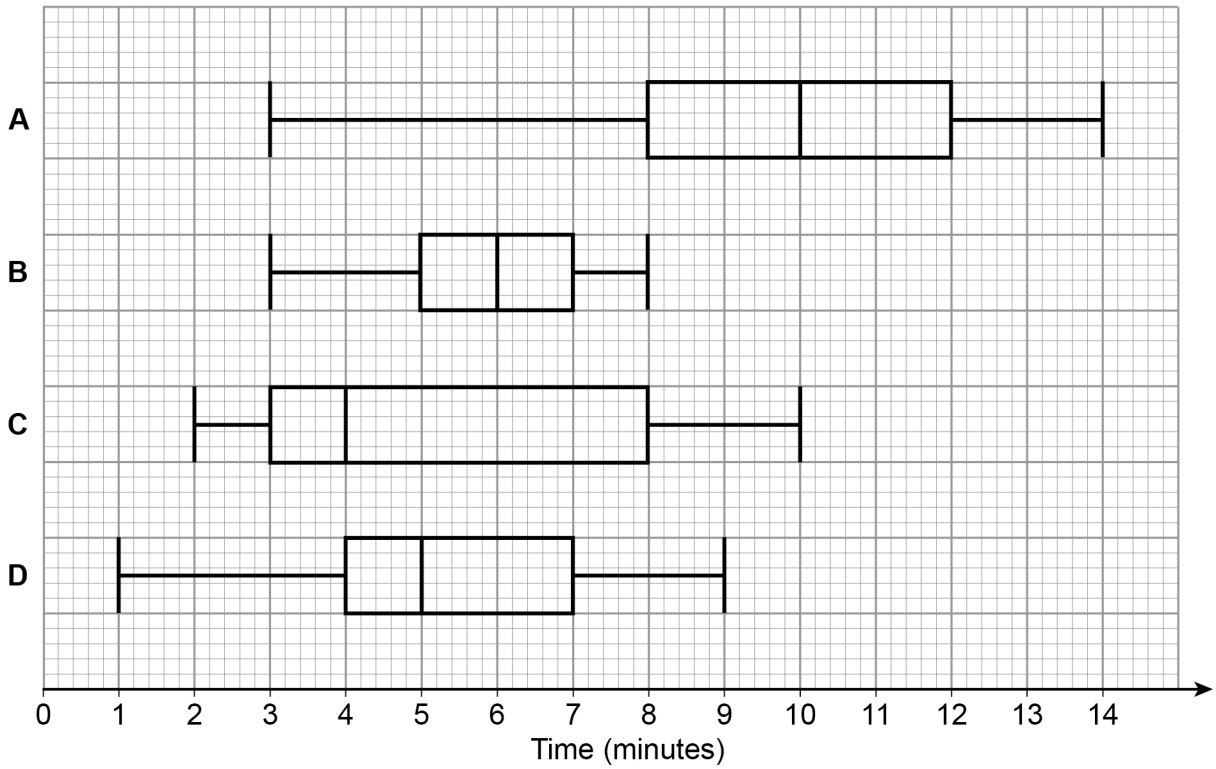
Turn over for the next question

8

Do not write outside the box

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 _____

_____

Do not write outside the box

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]

_____

_____

_____

Answer _____

Turn over for the next question

7

Do not write outside the box

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

Do not write outside the box

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

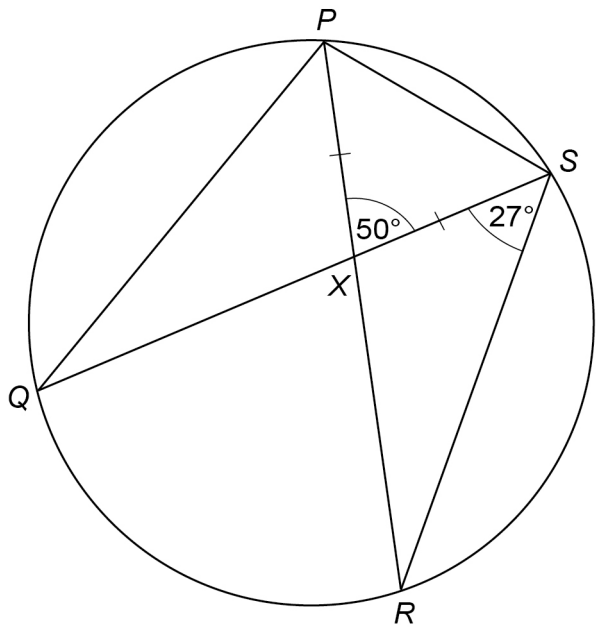
Turn over ►

Do not write outside the box

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

PXR and *QXS* are straight lines.

PX = *SX*



Not drawn accurately

Prove that *QS* is **not** a diameter of the circle.

[4 marks]

Do not write outside the box

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 for the next question

7

Do not write outside the box

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

You **must** show your working.

[4 marks]

$x =$ _____

Do not write outside the box

23 Prisms A and B are similar.

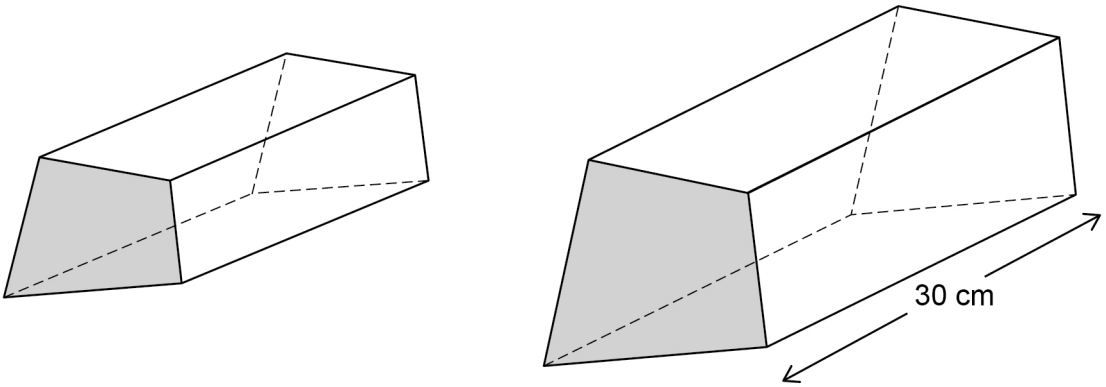
The cross sections are shaded.

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

9

Turn over ►

Do not write outside the box

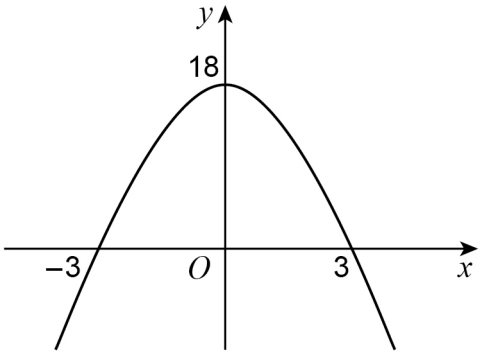
24 Show that $\frac{2\sqrt{6}}{\sqrt{5}} - \frac{\sqrt{3}}{\sqrt{10}}$ can be written in the form $\frac{c\sqrt{d}}{10}$

where c and d are integers.

[3 marks]

Do not write outside the box

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



Not drawn accurately

Work out the equation of the curve.

[3 marks]

Answer _____

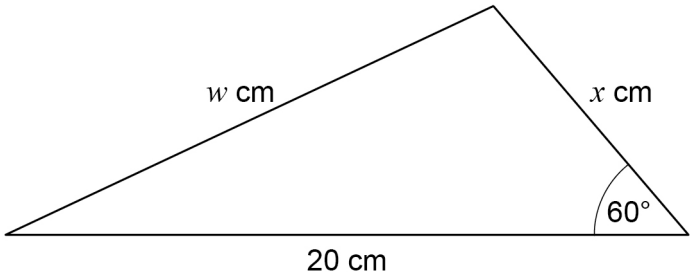
Turn over for the next question

6

Do not write outside the box

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

Not drawn accurately



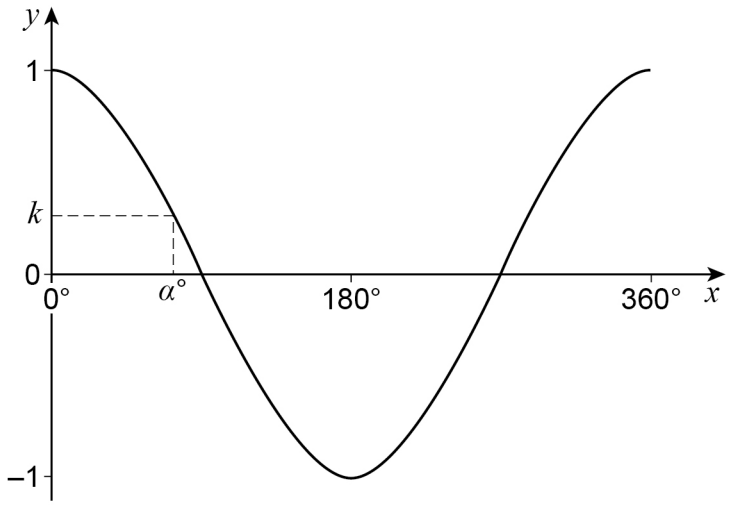
Work out the value of w.
Give your answer in the form $a\sqrt{b}$ where a and b are integers greater than 1

[5 marks]

Answer _____

Do not write outside the box

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



Not drawn accurately

$\alpha°$ is an acute angle.

$\cos \alpha° = k$

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

Do not write outside the box

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Copyright information

For confidentiality purposes, from the November 2015 examination series, acknowledgements of third-party copyright material will be published in a separate booklet rather than including them on the examination paper or support materials. This booklet is published after each examination series and is available for free download from www.aqa.org.uk after the live examination series.

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders may have been unsuccessful and AQA will be happy to rectify any omissions of acknowledgements. If you have any queries please contact the Copyright Team, AQA, Stag Hill House, Guildford, GU2 7XJ.

Copyright © 2018 AQA and its licensors. All rights reserved.