Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

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

General Certificate of Secondary Education
Higher Tier

Mathematics (Linear) B

4365/1H

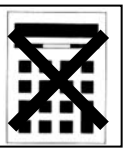
Paper 1 Non-calculator

H

Practice Paper 2012 Specification (Set 4)

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.



Time allowed
- 1 hour 30 minutes

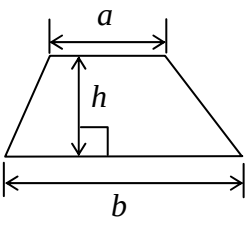
Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 70.
- The quality of your written communication is specifically assessed in question 4 and 10.
  These questions are indicated with an asterisk (✶).
- You may ask for more answer paper, graph paper and tracing paper.
  These must be tagged securely to this answer booklet.

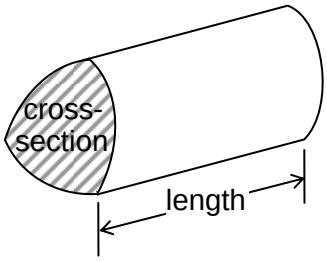
Advice
- In all calculations, show clearly how you work out your answer.

Formulae Sheet: Higher Tier

Area of trapezium = $\frac{1}{2}(a+b)h$

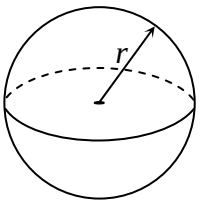


Volume of prism = area of cross-section × length



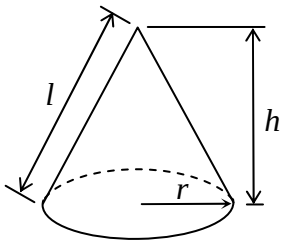
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3}\pi r^2 h$

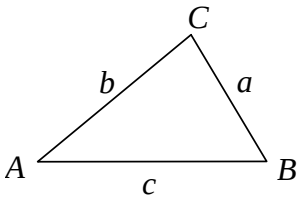
Curved surface area of cone = $\pi r l$



In any triangle ABC

Area of triangle = $\frac{1}{2}ab\sin C$

Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$



Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

The Quadratic Equation

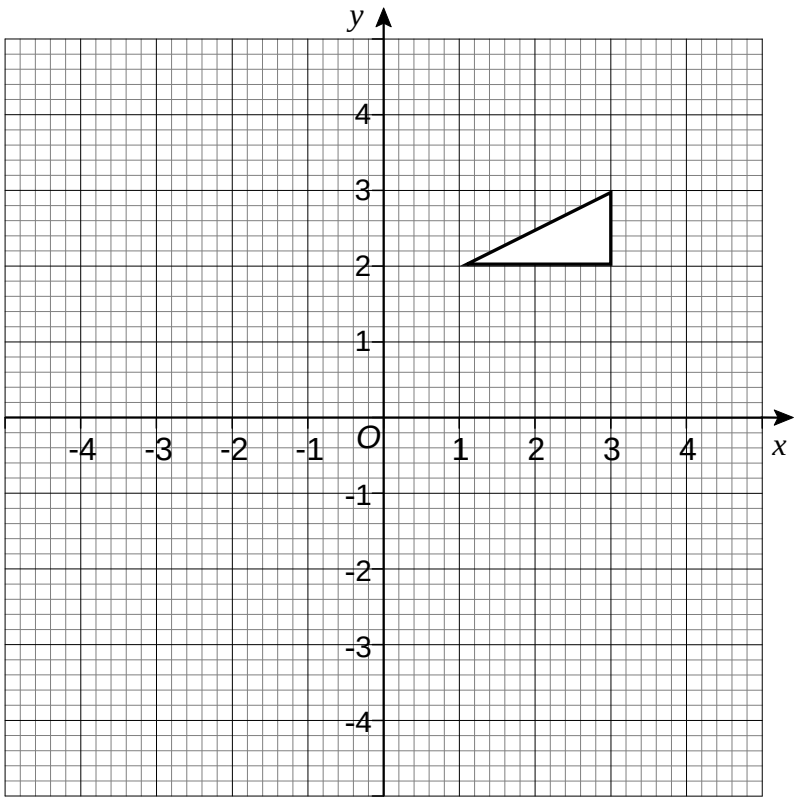
The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Do not write outside the box

Answer **all** questions in the spaces provided.

1 Reflect the triangle in the line $x = 1$



(2 marks)

Turn over for the next question

2

2 Solve $6x + 9 = 2x - 5$

.....

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.....

$x =$ ..... *(3 marks)*

3 p is a prime number less than 20.

q is a square number less than 20.

$$p + q = 29$$

Work out p and q.

.....

.....

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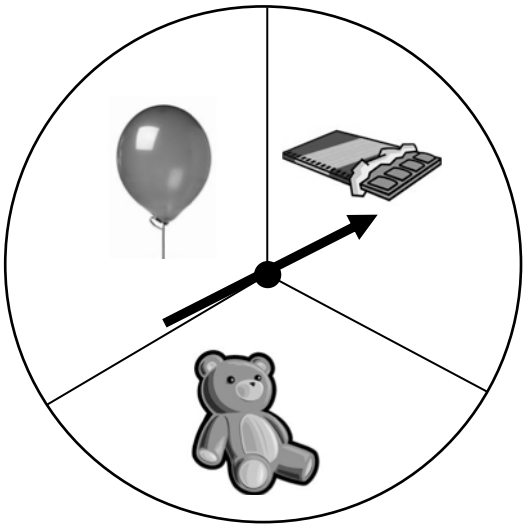
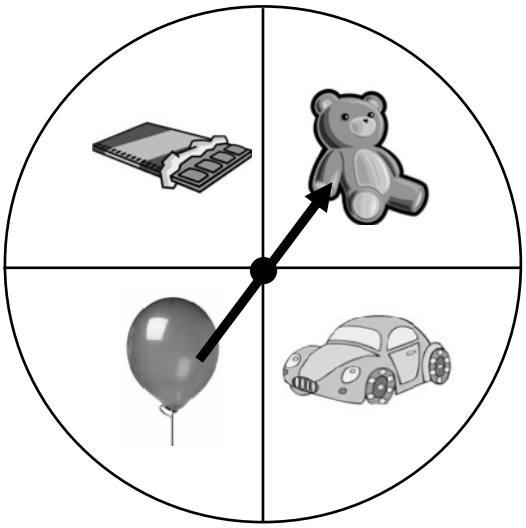
.....

$p =$ ..... $q =$ ..... *(3 marks)*

***4** In a game, the arrow in each spinner is spun.

If the arrows land on the same picture, a prize is won.

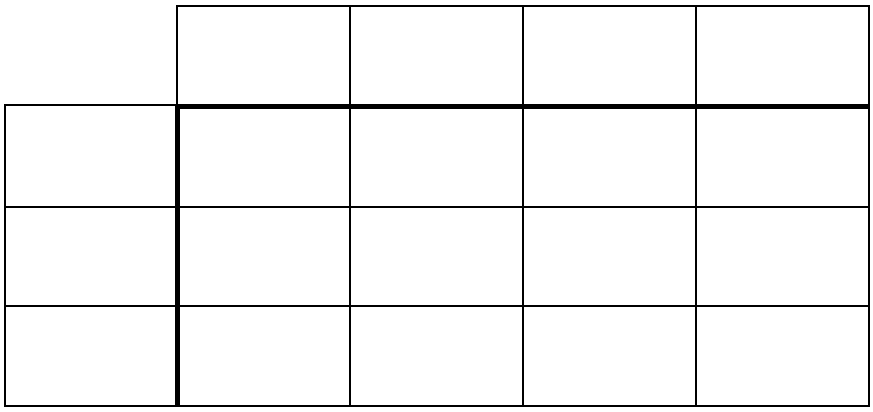




Work out the probability of winning a prize.

You may find the grid below useful.

Answer ..... *(4 marks)*



10

5 (a) Multiply out $5(x - 3)$

……

Answer ..... *(1 mark)*

5 (b) Factorise $3y - 12$

……

Answer ..... *(1 mark)*

5 (c) Expand and simplify $2(3w + 2) + 3(5w - 1)$

……

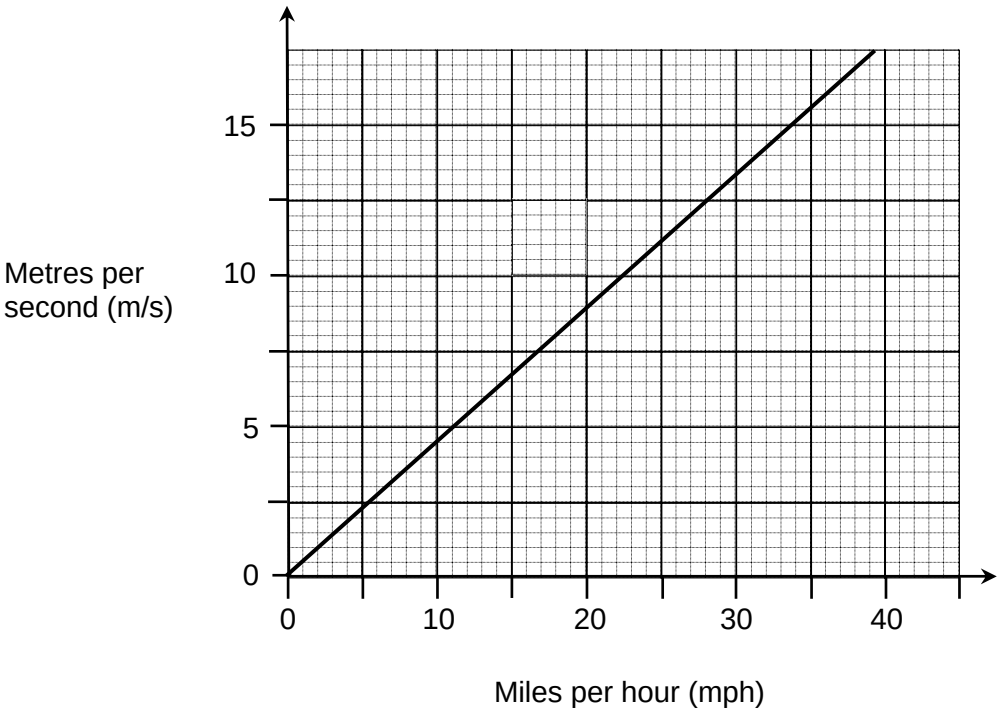
……

……

Answer ..... *(2 marks)*

Do not write outside the box

6 Here is a conversion graph.



6 (a) Use the graph to convert 50 m/s to mph.

You **must** show your working.

Answer ..... mph *(2 marks)*

6 (b) Carl runs 100 metres in 9.98 seconds.

Use the graph to **estimate** his average speed in miles per hour.

You **must** show your working.

Answer ..... mph *(3 marks)*

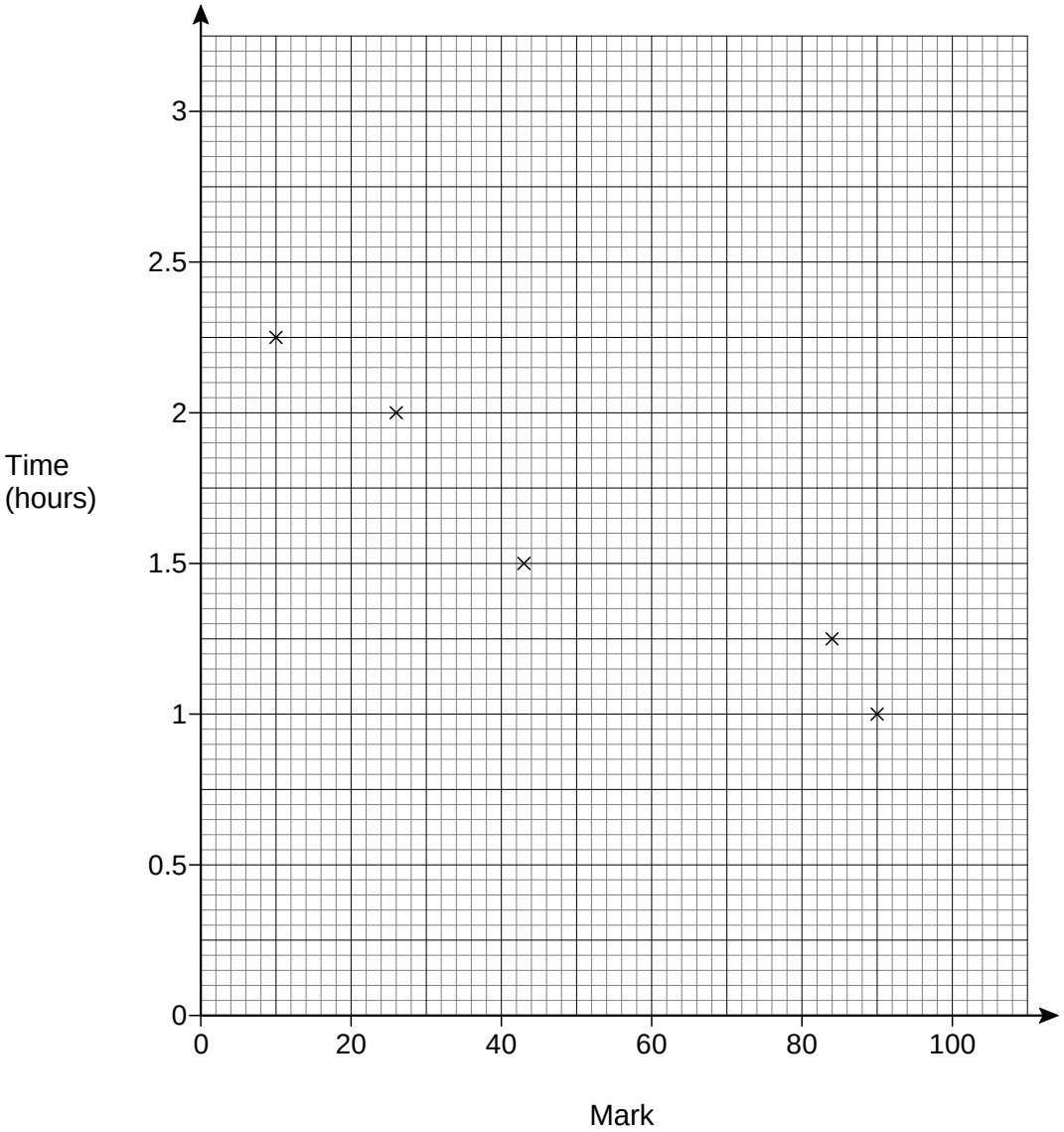
9

7 10 students record the time spent watching TV the evening before a test.
The table shows the times and their marks on the test.

Time (hours)	2.25	1	1.5	2	1.25	1.75	1.25	2.5	1.5	0.5
Mark	10	90	43	26	84	34	76	8	40	93

7 (a) Plot a scatter graph of the data.

The first five points have been plotted for you.



(2 marks)

Do not write outside the box

7 (b) Describe the correlation shown by the scatter graph.

Answer ……..... *(1 mark)*

7 (c) A headteacher wants to encourage students to revise more for tests.

How does the data support the headteacher?

……

……

……

……

(1 mark)

7 (d) Another student scored 60 on the test.

Use the scatter graph to estimate the number of hours she watched TV the evening before the test.

Show clearly how you obtained your answer.

Answer ……..... hours *(2 marks)*

Turn over for the next question

6

8 Jane uses her calculator to work out 36×24

Use the calculator display to help you.

8 (a) 36×12

Answer ……..... *(1 mark)*

8 (b) 37×24

Answer ……..... *(1 mark)*

8 (c) $8640 \div 36$

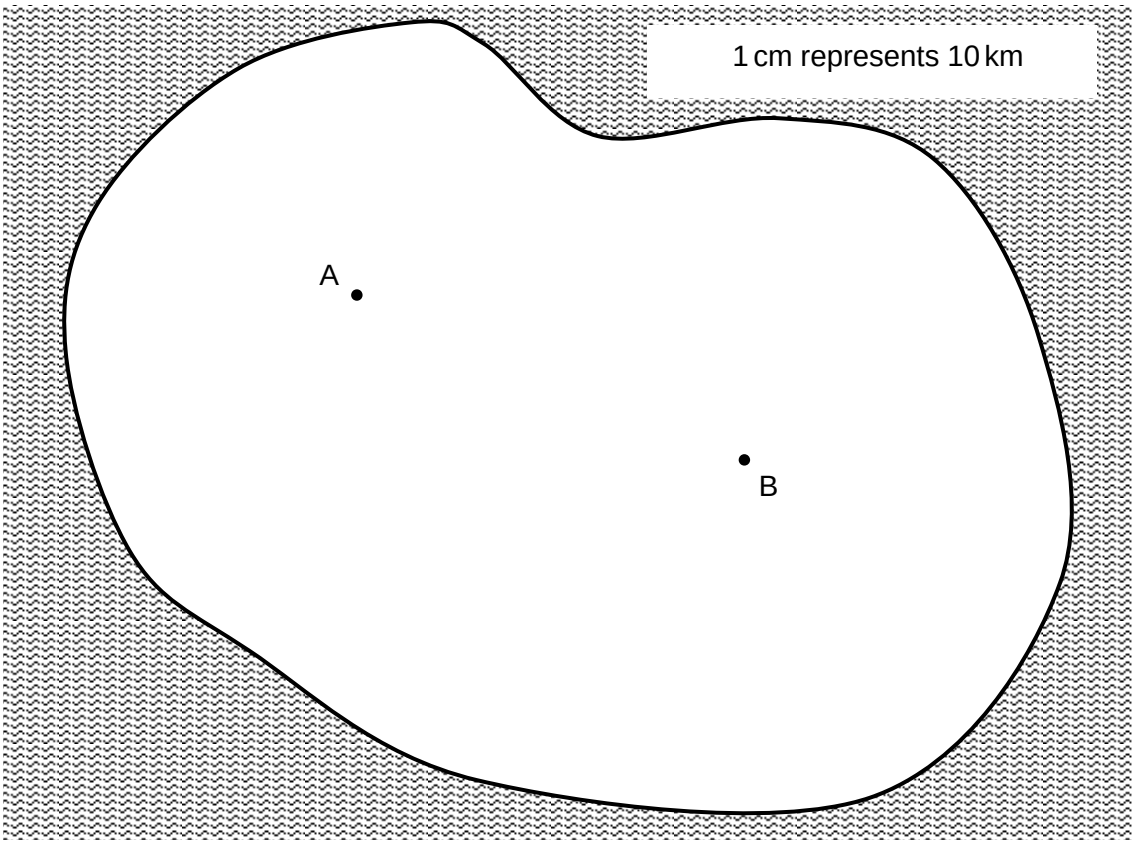
Answer ……..... *(1 mark)*

Do not write outside the box

9 There are two radio masts on an island.

Mast A has a range of 40 km.

Mast B has a range of 50 km.



Can all parts of the island receive radio signals?

Show how you decide.

(3 marks)

Turn over for the next question

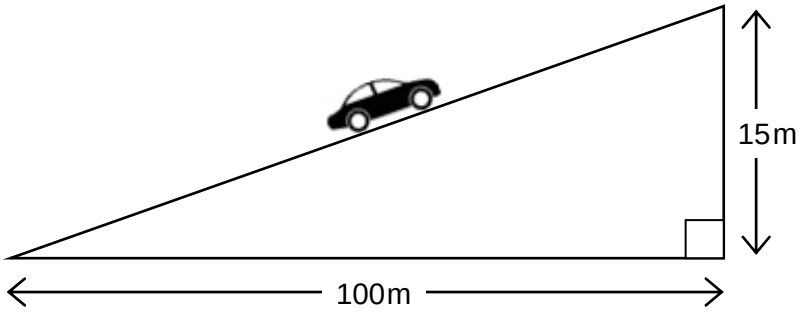
6

***10** Steep hills are shown by road signs showing a percentage.

For example.

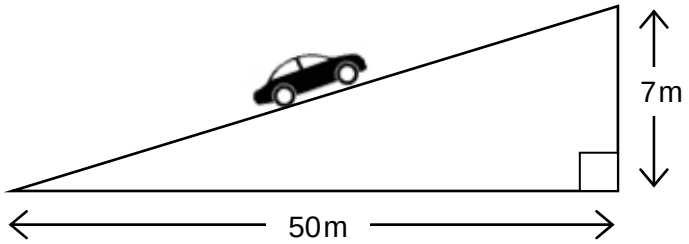
Not drawn accurately

This shows that for every 100 metres **horizontally** the road rises 15 metres **vertically**.



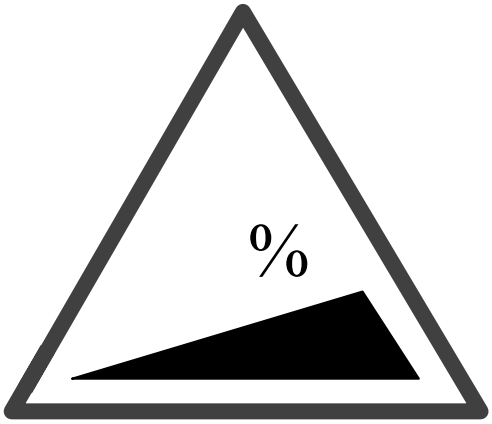
Not drawn accurately

10 (a) This road rises 7 metres **vertically** for every 50 metres **horizontally**.



Not drawn accurately

Fill in the percentage on the road sign.

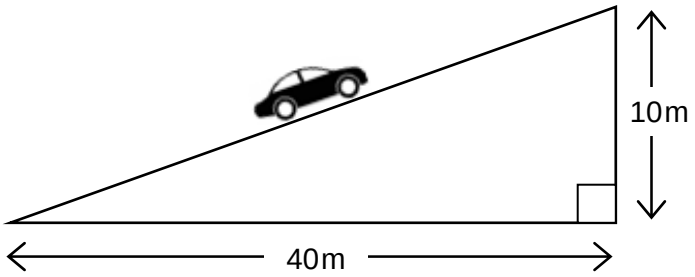


(1 mark)

Do not write outside the box

10 (b) Which of these two roads is the steepest?

Road A



Not drawn accurately

Road B

Not drawn accurately

Show how you decide.

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.....

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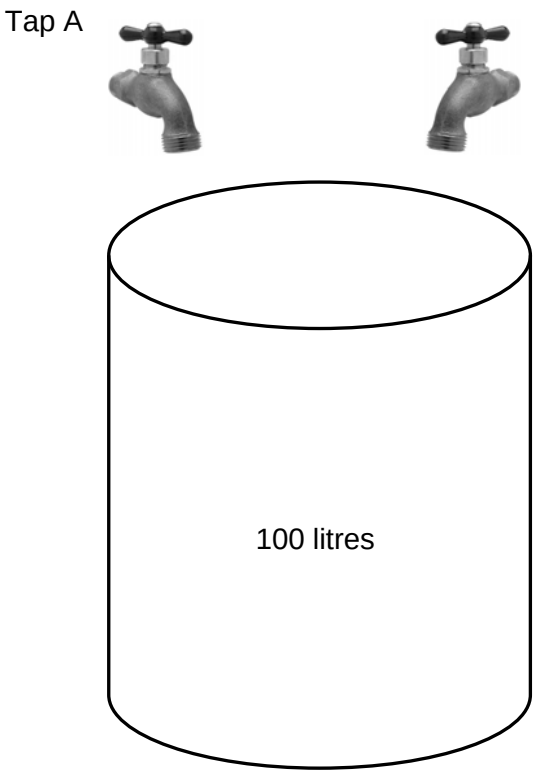
(2 marks)

Turn over for the next question

3

11



Tap A can fill the 100-litre barrel in 6 minutes.

Tap B can fill the 100-litre barrel in 3 minutes.

Both taps are turned on.

How long will it take to fill the barrel?

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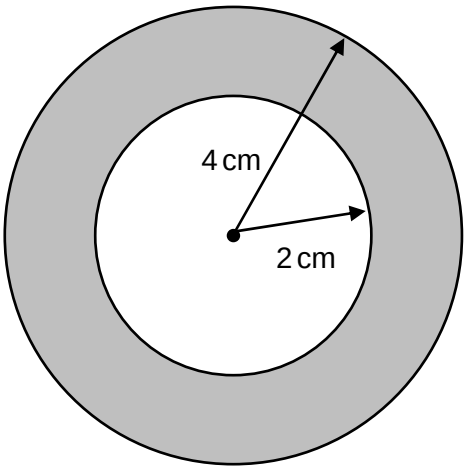
Answer ..... minutes *(3 marks)*

12 Two circles are shown.



Not drawn accurately

Work out the shaded area.

Give your answer in terms of π.

Answer ..... cm^2 *(3 marks)*

6

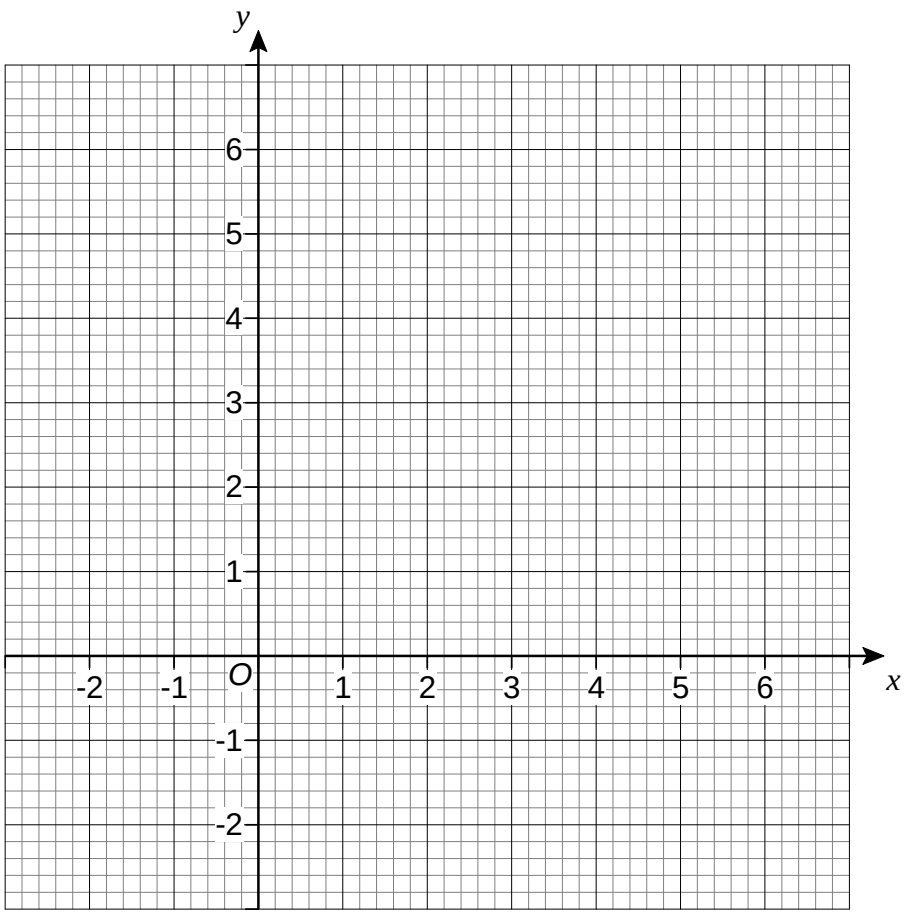
13 Draw the region represented by the three inequalities.

$y \leq 5$

$y \geq x$

$x + y \geq 4$

Label the region R.



(3 marks)

Do not write outside the box

14 Solve the simultaneous equations

$$4x + 3y = 3$$

$$y = 2x - 4$$

Do **not** use trial and improvement.

You **must** show your working.

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.....

$x =$ .....

$y =$ ..... *(4 marks)*

15 Solve $6x^2 - x - 12 = 0$

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Answer ..... *(3 marks)*

10

16 $ABCD$ is a cyclic quadrilateral.

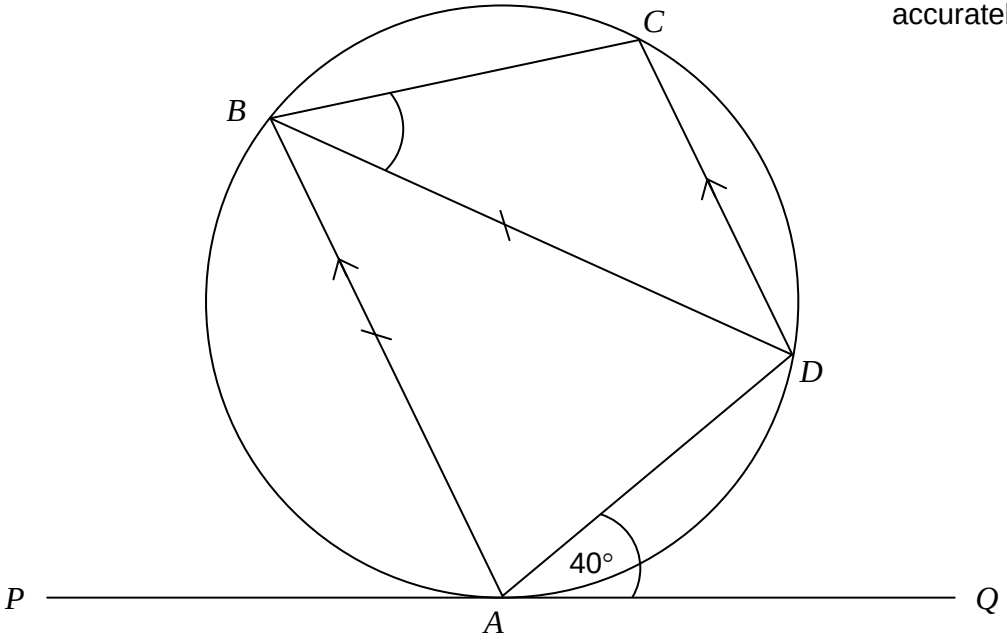
PQ is a tangent to the circle at A.

$AB = BD$

AB is parallel to DC.

Angle $QAD = 40°$.

Not drawn accurately



Work out the size of angle DBC.

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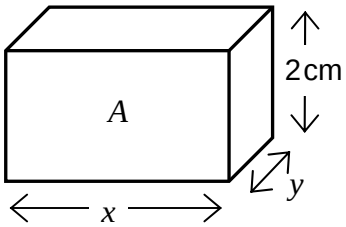
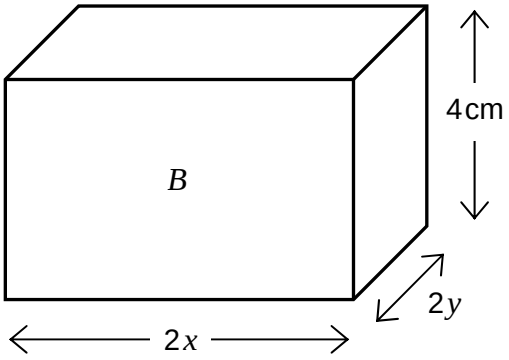
Answer ……..... degrees *(5 marks)*

17 Cuboid A is smaller than cuboid B.

Cuboid B has a volume of $120\,\text{cm}^3$.

Not drawn accurately



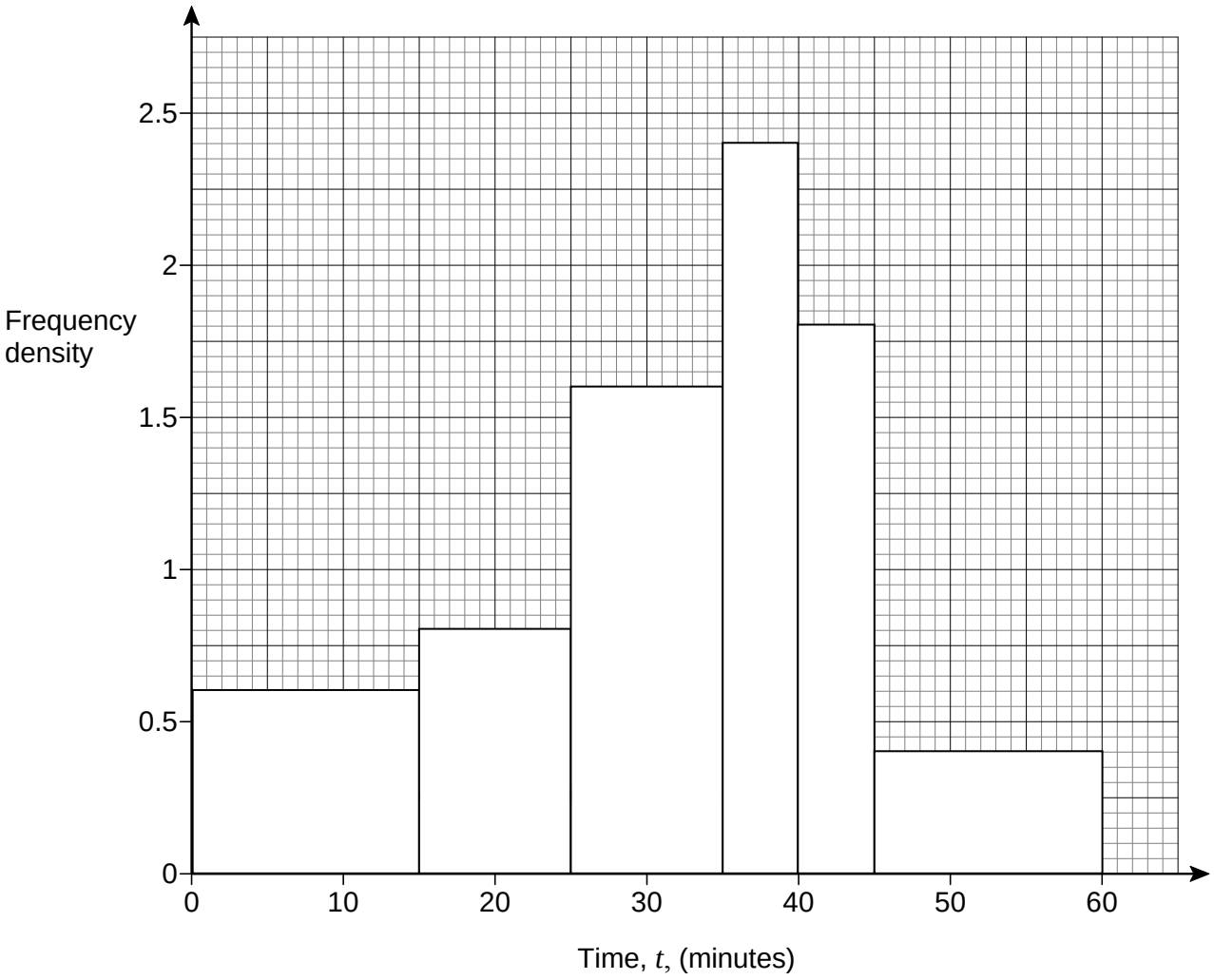


Work out the volume of cuboid A.

Answer ……..... cm^3 *(3 marks)*

8

18 The histogram shows the times, t (minutes), taken by a group of students to complete a fitness test.



How many students took the test?

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Answer ……..... *(3 marks)*

Do not write outside the box

19 Work out the value of $81^{-\frac{3}{4}}$

.....

.....

.....

Answer ..... *(2 marks)*

20 Work out the values of a and b such that

$$x^2 - 8x + 3 \equiv (x - a)^2 + b$$

.....

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.....

.....

a = ...

b = ... *(3 marks)*

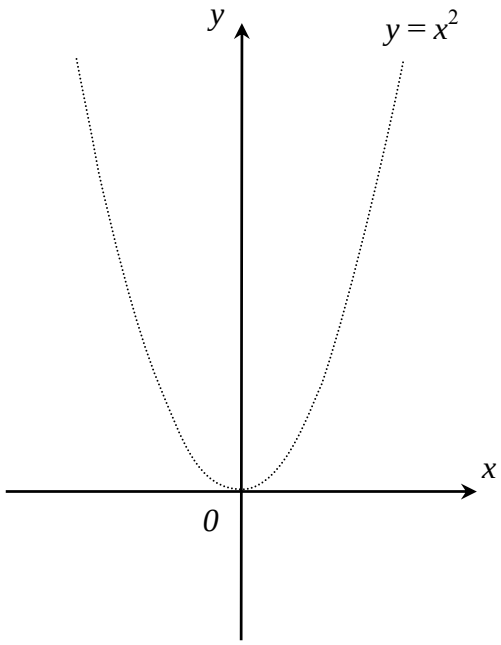
Turn over for the next question

8

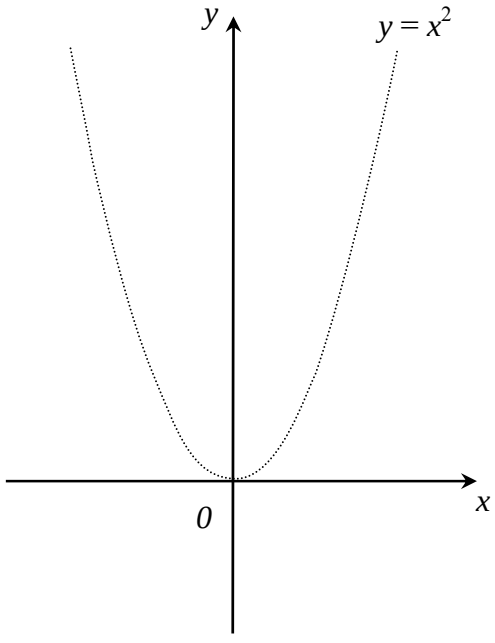
21 In each part the graph of $y = x^2$ is shown.

21 (a) On this grid sketch the graph of $y = x^2 - 1$

(1 mark)



21 (b) On this grid sketch the graph of $y = 2x^2$



(1 mark)

END OF QUESTIONS