Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

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

AQA

General Certificate of Secondary Education
Higher Tier
June 2014

Mathematics (Linear) 4365/1H

Paper 1

H

Monday 9 June 2014 9.00 am to 10.30 am

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator

Time allowed
- 1 hour 30 minutes

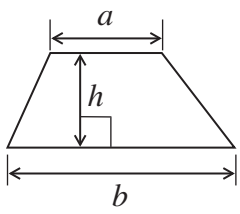
Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this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

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 Questions 2, 15 and 16. These questions are indicated with an asterisk (*).
- You may ask for more answer paper, tracing paper and graph paper. These must be tagged securely to this answer book.

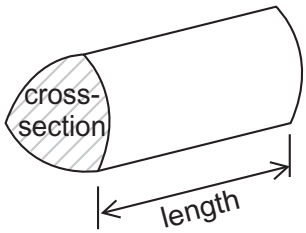
Advice
- In all calculations, show clearly how you work out your answer.

Formulae Sheet: Higher Tier

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

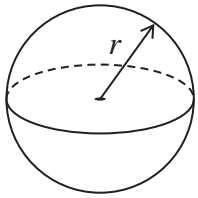


Volume of prism = area of cross section × length



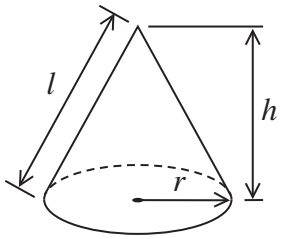
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

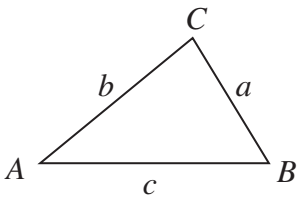
Curved surface area of cone = $\pi r l$



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

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

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

1 Circle the correct word to describe the following.

1 (a) $2x - 7y$

[1 mark]

Equation Expression Formula Identity

1 (b) $P = 2l + 2w$

[1 mark]

Equation Expression Formula Identity

1 (c) $8(x - y) \equiv 8x - 8y$

[1 mark]

Equation Expression Formula Identity

Turn over for the next question

3

***2** A shop is having a sale on DVDs and CDs.

DVDs are sold at one price.
CDs are sold at a different price.

2 DVDs and 1 CD cost £35
2 DVDs and 2 CDs cost £45

Martin has £50

Does he have enough to buy 1 DVD and 3 CDs?
You **must** show your working.

[5 marks]

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3 (a) Write down four **different** numbers that have

a **median** of 5
and a **range** of 7.

Put the numbers in order.

[2 marks]

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Answer ..... , ... , ... , ...

3 (b) The table shows the scores of 20 students in a test.

Score	**Frequency**
7	6
8	9
9	4
10	1
Total	20

Work out the mean score.

[3 marks]

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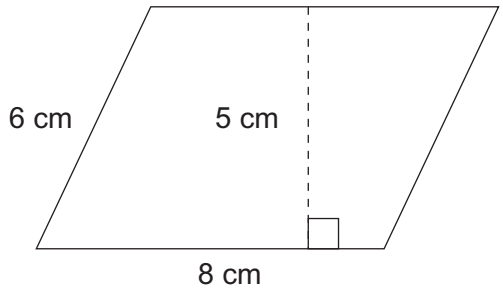
Answer .....

10

4 (a) Work out the area of this parallelogram.



Not drawn accurately

State the units of your answer.

[3 marks]

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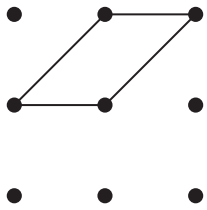
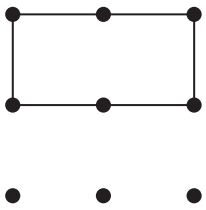
Answer .....

4 (b) Shaz is drawing quadrilaterals on a nine-point square grid by joining points.

For example





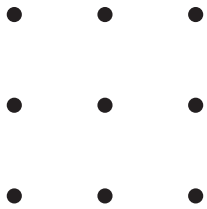
She says,

"If you draw a quadrilateral it will **always** have line or rotational symmetry."

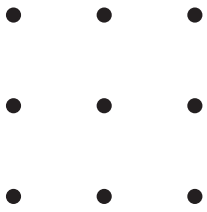
Draw a quadrilateral on the grid below to show that Shaz is wrong.
Use the first two grids for practice and the bottom grid for your answer.

[1 mark]

Practice grids



Answer grid



4

5 (a) Work out the Highest Common Factor (HCF) of 24 and 42

[2 marks]

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Answer .....

5 (b) As a product of prime factors $36 = 2^2 \times 3^2$

Write 48 as a product of prime factors.

[2 marks]

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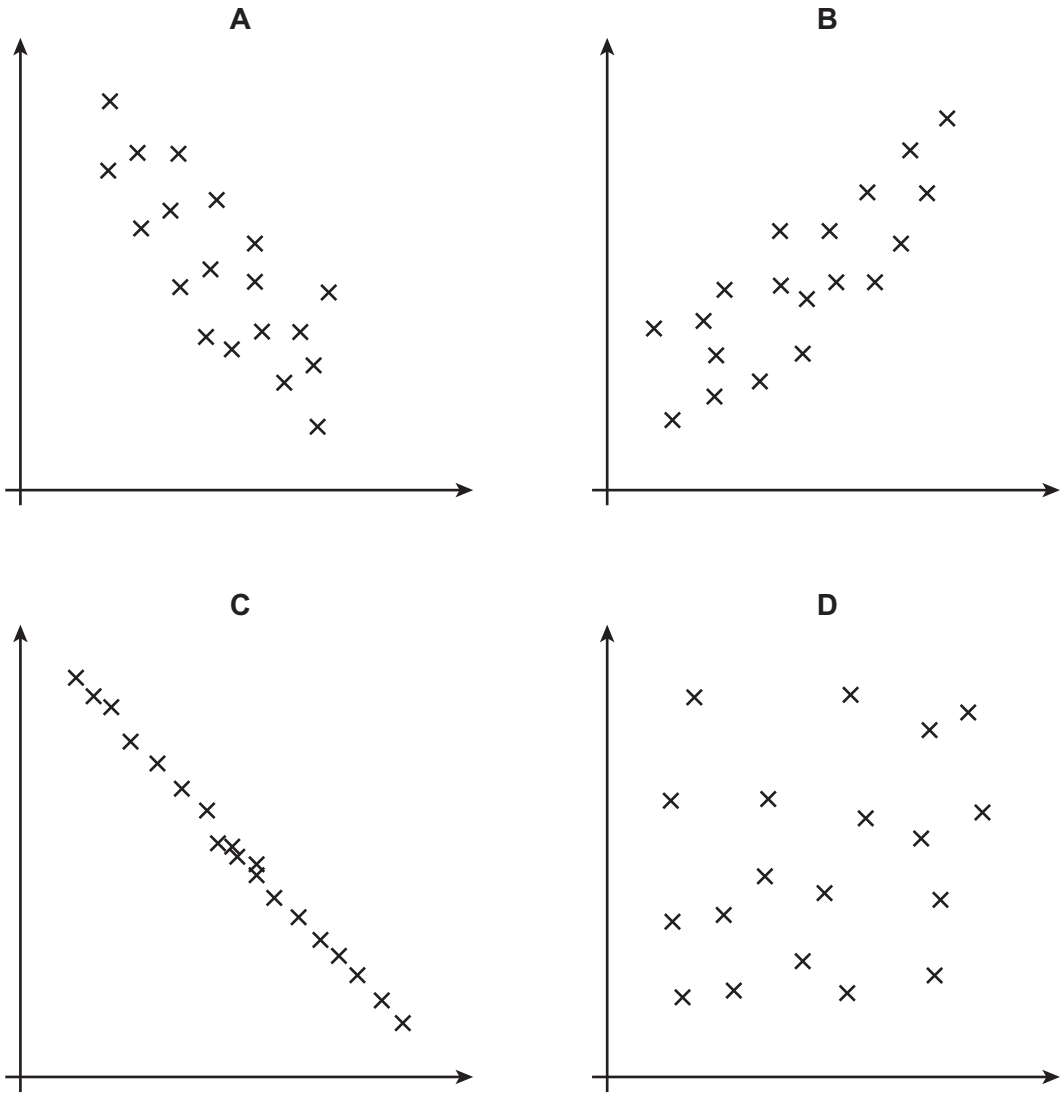
Answer .....

6 Here are four scatter diagrams.



Choose a letter to complete these sentences.

[2 marks]

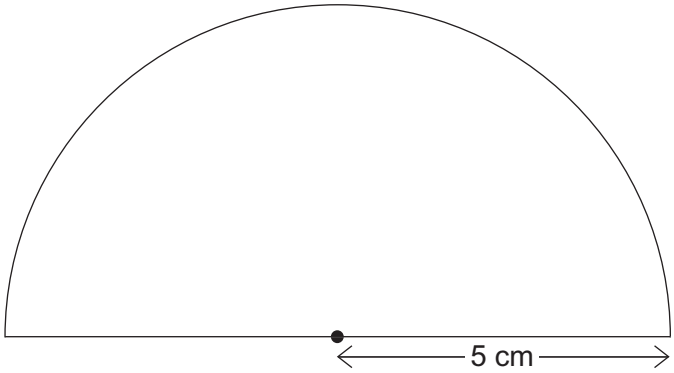
Scatter diagram ..... shows no correlation.

Scatter diagram ..... shows positive correlation.

Scatter diagram ..... shows strong negative correlation.

6

7 This semi-circle has a radius of 5 cm



Not drawn accurately

Work out the **perimeter** of the semi-circle.
Remember to include the base.
Use the approximation $\pi = 3.1$

[3 marks]

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Answer..... cm

8 (a) Solve $x^2 = 36$

[2 marks]

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Answer .....

8 (b) Solve $\frac{y + 1}{3} + \frac{y - 2}{2} = 2$

[4 marks]

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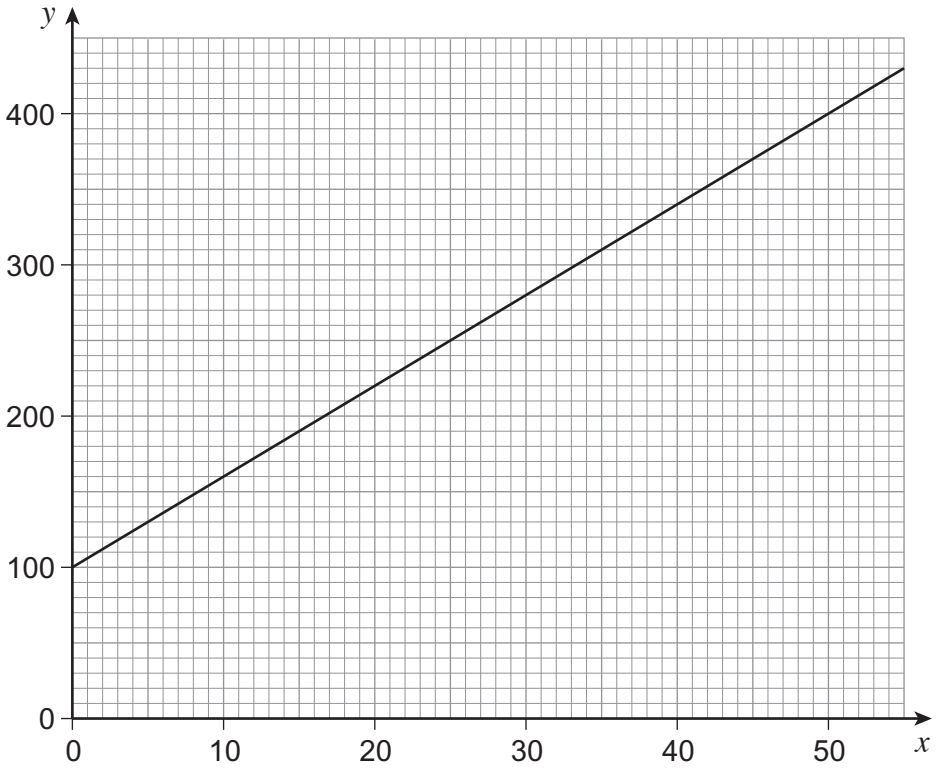
$y =$ .....

9

9 (a) The graph shows the line $y = ax + b$

Work out the values of a and b.

[2 marks]



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Answer a = ...

b = ...

9 (b) Work out the value of y when $x = 80$

[2 marks]

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Answer .....

Turn over for the next question

4

10 The table shows data about the times for men and women in a race.

	Mean	**Interquartile range**
Men	34m 50s	6m 30s
Women	40m 10s	4m 45s

Use data from the table to make **two** comparisons between the performances of the men and women in the race.

[2 marks]

Comparison 1

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Comparison 2

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11 Paul travels from Rye to Eston at an average speed of 90 km/h
He travels for T hours.

Mary makes the same journey at an average speed of 70 km/h
She travels for 1 hour longer than Paul.

Work out the value of T

[4 marks]

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Answer ..... hours

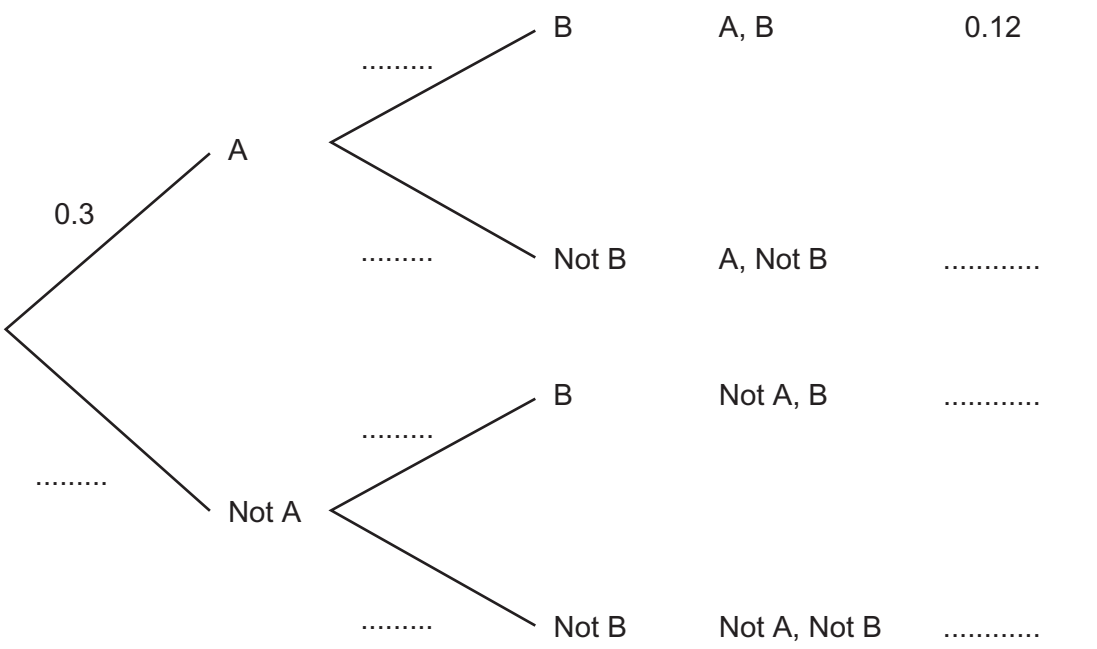
Turn over for the next question

6

12 A and B are independent events.

Fill in **all** eight missing probabilities in the diagram below.

[4 marks]



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13 The sum of two numbers is 15.
The difference of the same two numbers is 8.

Use algebra to work out the numbers.

Do **not** use trial and improvement.
You **must** show your working.

[4 marks]

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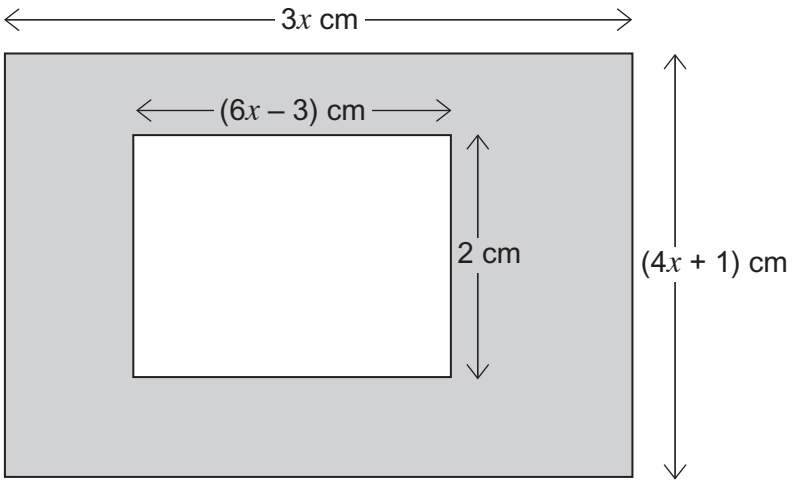
Answer ..... and .....

Turn over for the next question

8

14 The diagram shows two rectangles.



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14 (a) Show the shaded area, in cm^2, is given by $12x^2 - 9x + 6$

[2 marks]

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14 (b) The shaded area is 6 cm^2

Calculate the value of x.

[3 marks]

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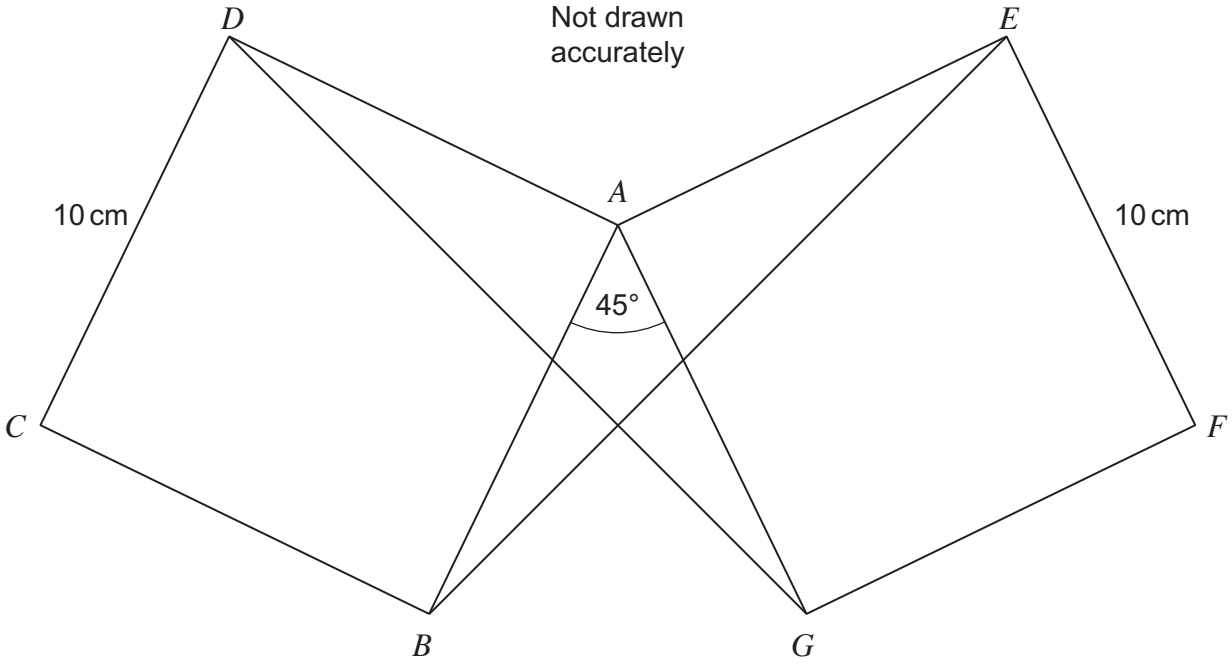
Answer .....

***15** $ABCD$ and $AEFG$ are identical squares.
$CD = EF = 10$ cm
Angle $BAG = 45°$



Prove that triangles AGD and ABE are congruent.

[4 marks]

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Turn over ▶

16 (a) Show clearly that $(x - y)(x + y) \equiv x^2 - y^2$

[1 mark]

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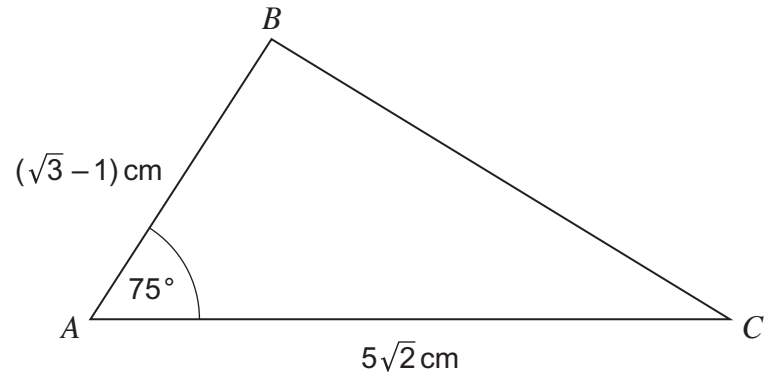
***16 (b)**



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You are given that $\sin 75^\circ = \dfrac{\sqrt{3} + 1}{2\sqrt{2}}$

Show that the area of triangle ABC is $2\frac{1}{2}$ cm^2

[3 marks]

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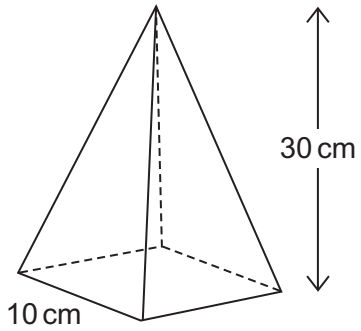
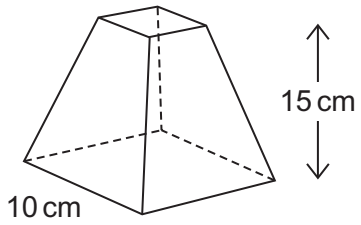
17 A pyramid has

a square base of side 10 cm
a height of 30 cm



It is cut horizontally at a height of 15 cm
The top pyramid is removed to leave this frustum.



You are given the formula

$$\text{Volume of pyramid} = \frac{1}{3} \times \text{area of base} \times \text{vertical height}$$

Calculate the volume of the frustum.

[3 marks]

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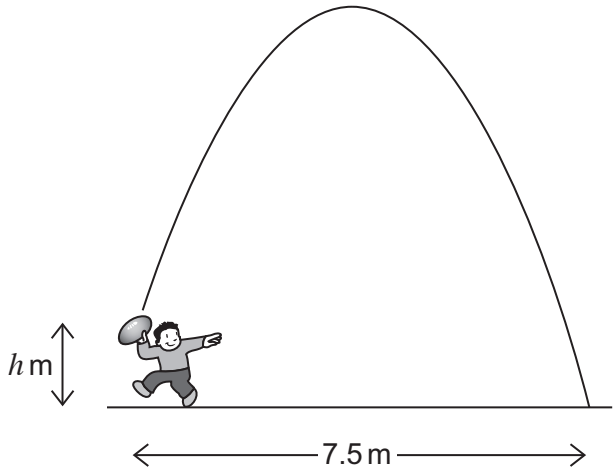
Answer ..... cm^3

7

Turn over ▶

18 The diagram shows a ball being thrown.
It is thrown from a height h metres above level ground.
It lands 7.5 metres from where it was thrown.



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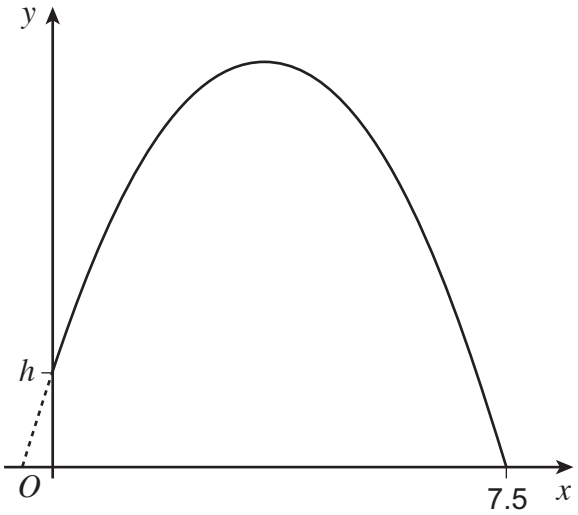
The path of the ball can be modelled by the equation $y = -\frac{1}{15}(2x + 1)(2x - 15)$

The sketch shows the graph of the equation.



18 (a) Work out the value of h.
You **must** show your working.

[2 marks]

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Answer .....

18 (b) Show that the maximum height reached by the ball is $4\frac{4}{15}$ metres.

Use the symmetry of the graph to help you.

You **must** show your working.

[2 marks]

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END OF QUESTIONS

4

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED