

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										



General Certificate of Secondary Education
Higher Tier

Mathematics (Linear) B

4365/2H

Paper 2 Calculator

Practice Paper 2012 Specification (Set 4)

H

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 – 23	
24 – 25	
26 – 27	
TOTAL	

<p>For this paper you must have:</p> <ul style="list-style-type: none"> mathematical instruments a calculator. 	
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Time allowed

- 2 hours

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

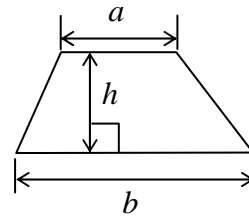
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 105.
- The quality of your written communication is specifically assessed in Questions 2 and 7.
These questions are indicated with an asterisk (*).
- You may ask for more answer paper, graph paper and tracing paper.
These must be tagged securely to this answer booklet.

Advice

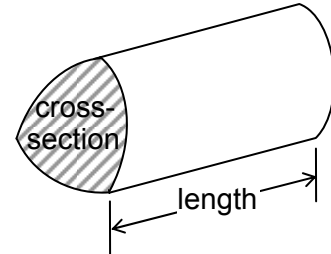
- In all calculations, show clearly how you work out your answer.

Formulae Sheet: Higher Tier

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

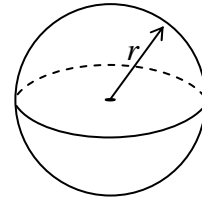


Volume of prism = area of cross-section \times length



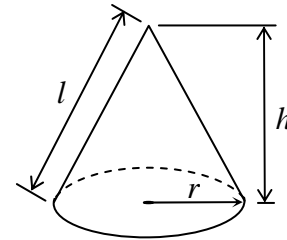
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

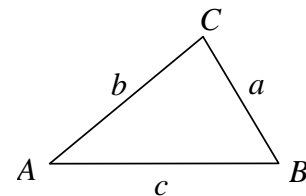


In any triangle ABC

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 To make 30 biscuits you need

300g of flour

250g of butter

140g of sugar

Work out what you need to make 45 biscuits.

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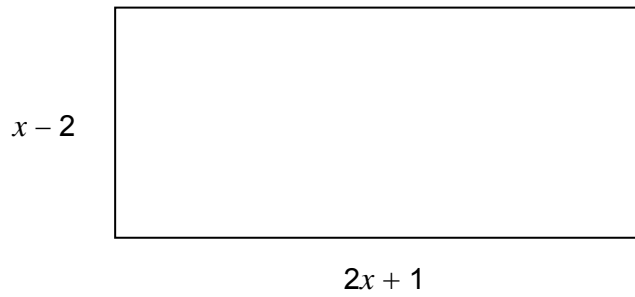
Answer g flour

..... g butter

..... g sugar (3 marks)

Turn over for the next question

- *2 The perimeter of this rectangle is 43cm.



Not drawn
accurately

Set up and solve an equation to work out the value of x .

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Answer cm (5 marks)

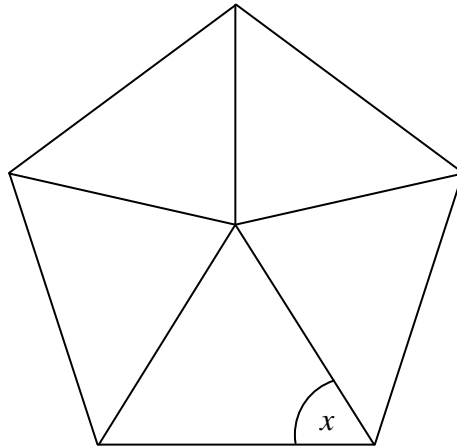
- 3** Sally wants to know whether students in her school can swim or not.
She also wants to know whether they are boys or girls.

Design a two-way table she can use to collect this information.

(3 marks)

Turn over for the next question

- 4 This regular pentagon is divided into five congruent triangles.



Not drawn
accurately

Work out the size of angle x .

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Answer degrees (4 marks)

5 Here is a linear sequence.

$$\frac{1}{3} \quad \frac{1}{2} \quad \frac{2}{3} \quad \dots$$

5 (a) Work out the rule for continuing the sequence.

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Answer (2 marks)

5 (b) Work out the next number in the sequence.

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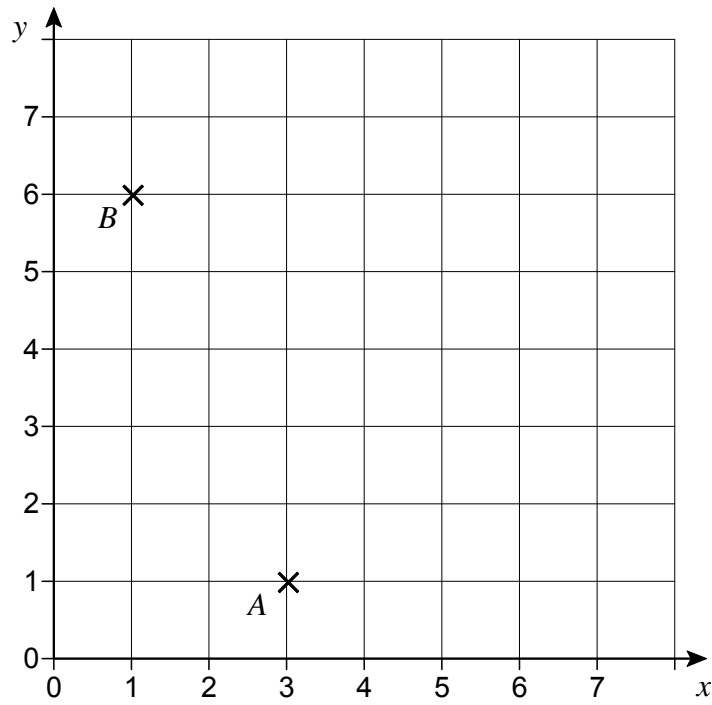
Answer (1 mark)

Turn over for the next question

6

$ABCD$ is a parallelogram.

A and B are shown on a centimetre grid.



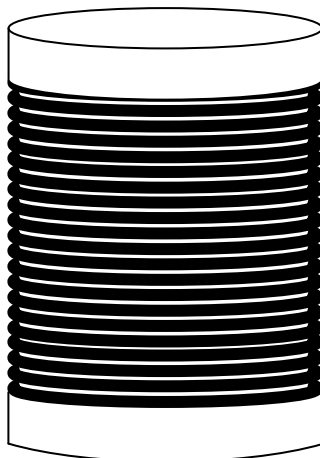
The area of the parallelogram is 15cm^2 .

Write down the coordinates of C and D .

C (.....,

D (.....,) (2 marks)

***7** Electric cable is sold on a cylindrical drum.
The diameter of the drum is 30cm.



The cable is wrapped around the drum 20 times without overlaps.
An electrician needs 75 metres of cable for a job.

How many drums does he need to buy?

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Answer (5 marks)

Turn over for the next question

8

A factory makes 2000 CDs.

The probability that a CD chosen at random is **not** faulty is 0.992

How many CDs are likely to be faulty?

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Answer (3 marks)

- 9 The table shows the heights of 250 trees in a wood.

Height, h (metres)	Frequency
$0 < h \leq 5$	31
$5 < h \leq 10$	34
$10 < h \leq 15$	54
$15 < h \leq 20$	63
$20 < h \leq 25$	68

- 9 (a) Which group contains the median height?

Answer (1 mark)

- 9 (b) Calculate an estimate for the mean height of the trees.

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Answer metres (4 marks)

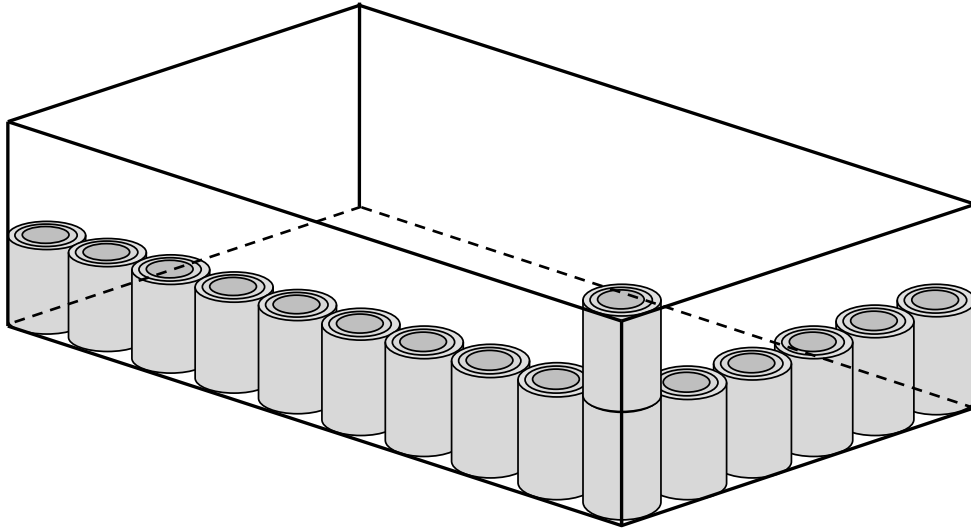
- 9 (c) Explain why the range must be between 15 metres and 25 metres.

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(2 marks)

10 Tins of soup are packed in a box as shown.



The cost of each tin is 46p.

A 15% discount is given when a full box of tins is bought.

Work out the cost of the whole box of tins.

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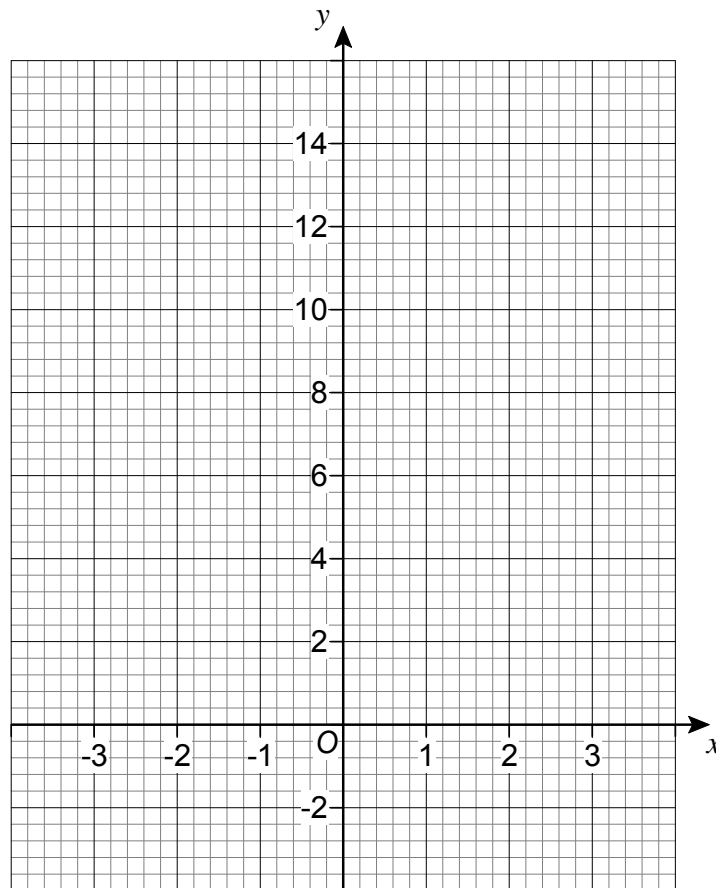
Answer £ (5 marks)

11 (a) Complete the table for $y = x^2 + 2x - 1$

x	-3	-2	-1	0	1	2	3
y	2	-1		-1	2		14

(2 marks)

11 (b) On this grid, draw the graph of $y = x^2 + 2x - 1$ for values of x from -3 to 3

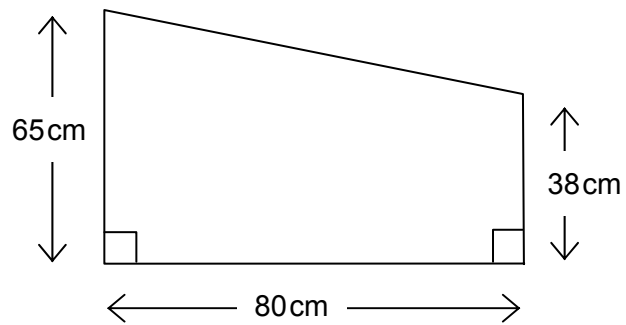


(2 marks)

11 (c) Use your graph to find solutions to $x^2 + 2x - 1 = 0$

Answer (2 marks)

12 (a) Work out the area of the trapezium.



Not drawn
accurately

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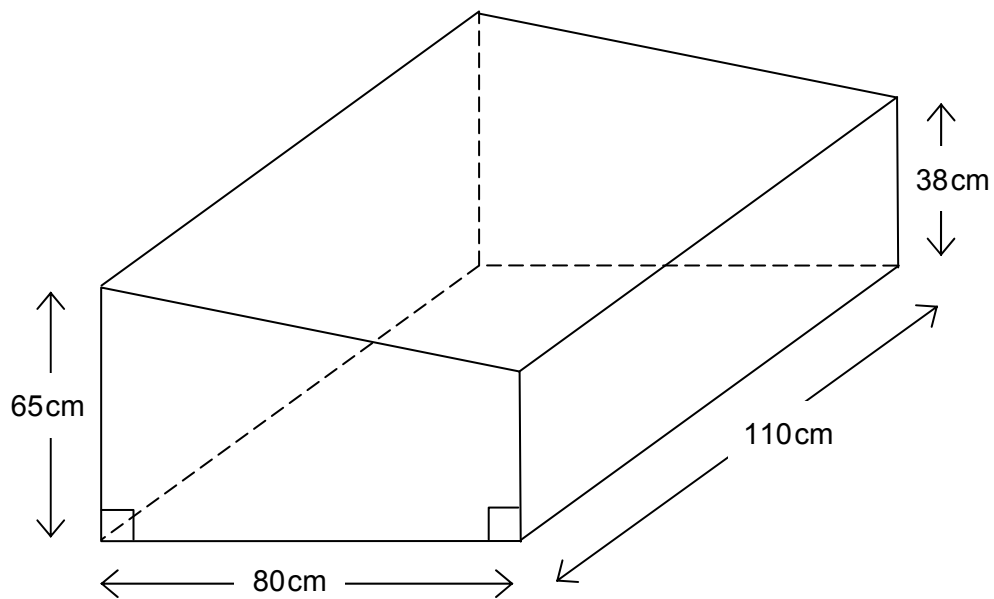
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Answercm² (2 marks)

12 (b) Use your answer to part (a) to work out the volume of this prism.



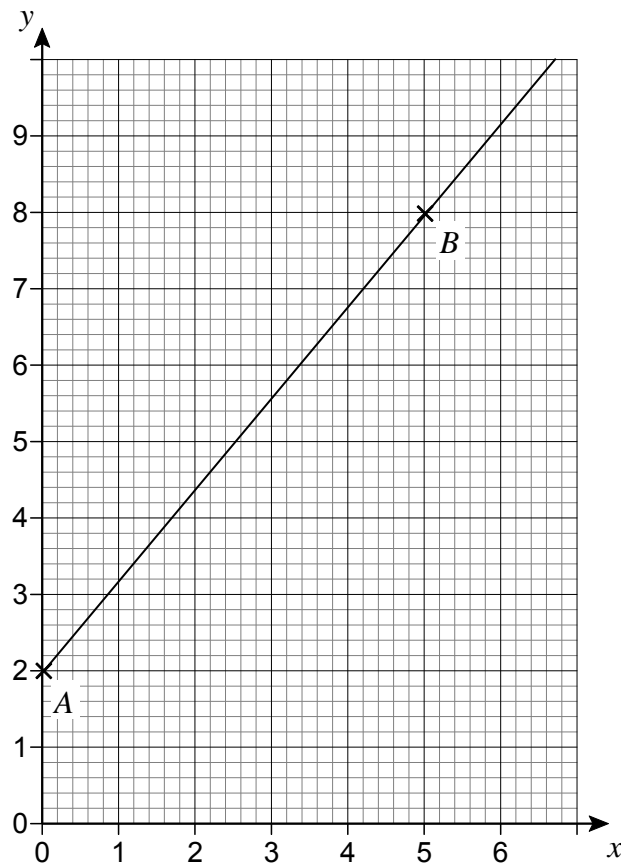
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Answer cm^3 (2 marks)

Turn over for the next question

13 (a) Work out the gradient of the line AB .



Answer (2 marks)

13 (b) Write down the equation of the line AB in the form $y = mx + c$

Answer (1 mark)

- 14** A car travels 30 **miles** for each **gallon** of petrol.
The fuel tank has 36 **litres** of petrol.
How many **miles** can the car travel before it runs out of fuel?

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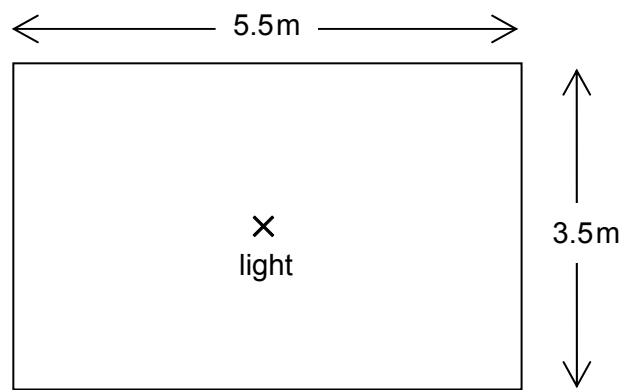
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Answer miles (4 marks)

Turn over for the next question

- 15 A light is fixed in the middle of a rectangular ceiling.



Not drawn
accurately

Work out the distance between the light and a corner of the ceiling.
Give your answer to a suitable degree of accuracy.

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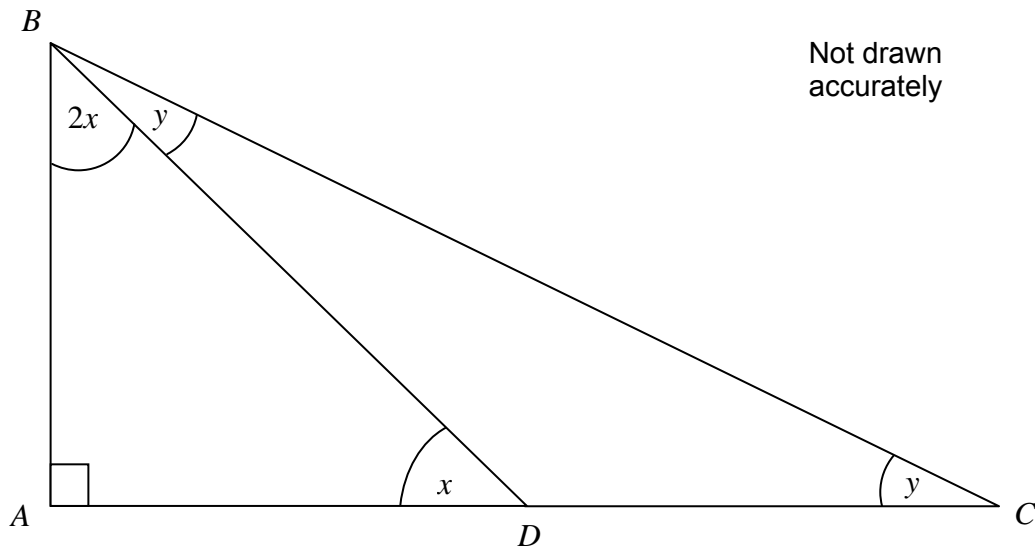
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Answer m (5 marks)

- 16 ABC is a right-angled triangle.



- 16 (a) Work out the value of x .

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Answer degrees (3 marks)

- 16 (b) Work out the value of y .

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Answer degrees (2 marks)

17 (a) Factorise $x^2 - 8x + 15$

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Answer (2 marks)

17 (b) Hence, simplify $\frac{x^2 - 8x + 15}{2x^2 - 5x - 3}$

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Answer (3 marks)

18 Write these numbers in order of size starting with the smallest.
You **must** show your working.

$15^{\frac{2}{3}}$ $215^{\frac{1}{3}}$ $20^{\frac{3}{5}}$

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Answer , , (2 marks)

- 19 A school has students in years 9, 10 and 11.

	Year 9	Year 10	Year 11
Number of boys	136	141	94
Number of girls	130	142	105

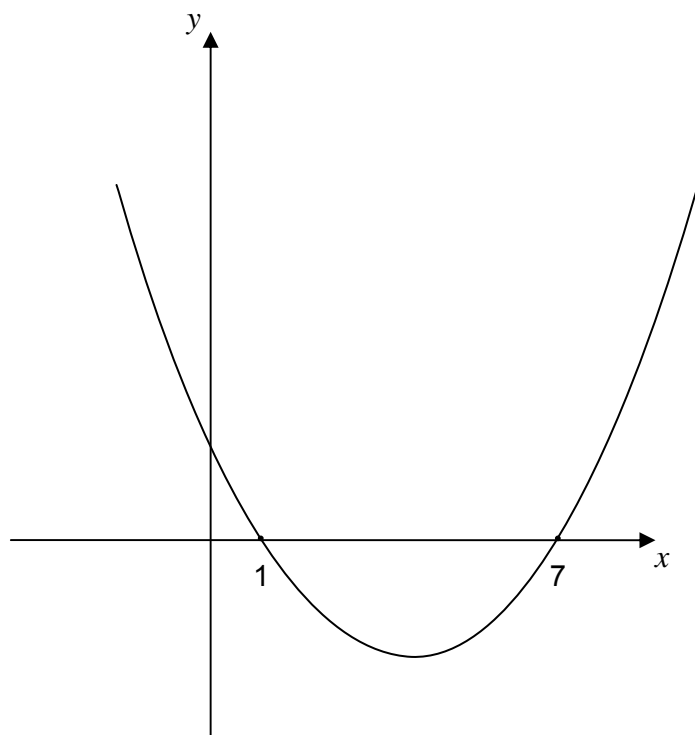
A 10% sample, stratified by gender and year group, is to be taken.

Complete the table below to show possible numbers in the sample.

	Year 9	Year 10	Year 11
Number of boys in the sample			
Number of girls in the sample			

(3 marks)

20

The diagram shows a sketch of the graph $y = x^2 + bx + c$ Work out the values of b and c .

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 $b =$ $c =$ (3 marks)

21 The price of a TV decreases by 15% each year.
The price of a two-year old TV is £433.50
Work out its price when it was new.

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Answer £ (3 marks)

22 A bag contains 2 black, 5 green and 3 yellow counters.
Two counters are chosen at random.
Work out the probability that they are the same colour.

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Answer (4 marks)

Turn over for the next question

23 Prove that $\frac{2n + 1}{2n} - \frac{n}{n + 1} \equiv \frac{3n + 1}{2n(n + 1)}$

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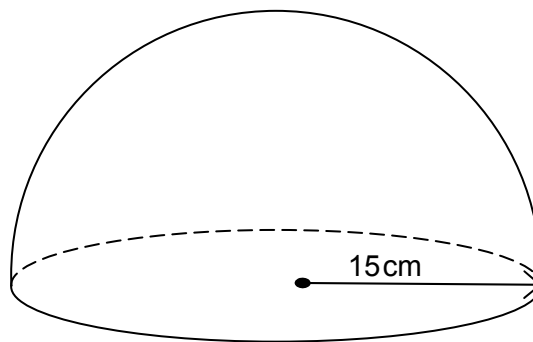
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(4 marks)

24 Work out the volume of a hemisphere, of radius 15cm.



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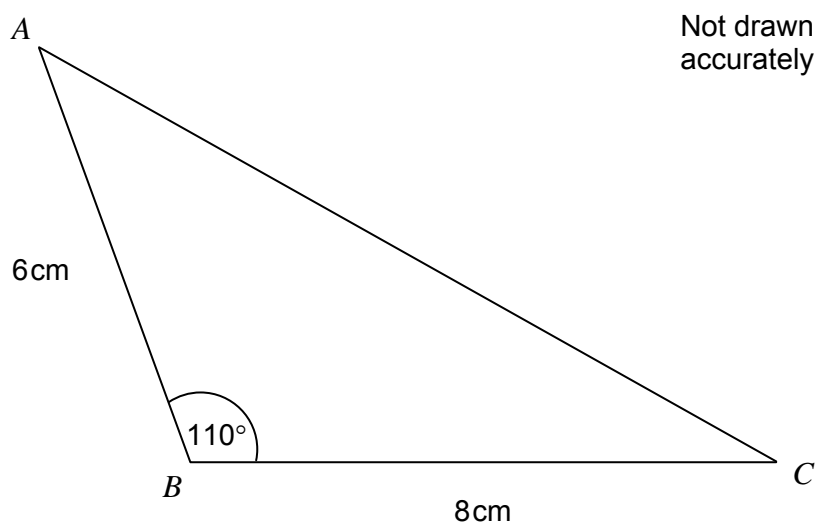
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Answer cm³ (3 marks)

25

The diagram shows a triangle ABC .

The lengths of AB and BC are given to the nearest centimetre.



Work out the maximum possible length of AC .

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Answer cm (4 marks)

Turn over for the next question

26 $x = 8.3 \times 10^5$
 $y = 2.4 \times 10^6$

26 (a) Work out the value of $x + y$
Give your answer in standard form.

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Answer (2 marks)

26 (b) Work out the value of xy
Give your answer in standard form.

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Answer (2 marks)

27 Solve $2x^2 - 4x - 5 = 0$

Give your answers to 2 decimal places.

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Answers (3 marks)

END OF QUESTIONS