Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

3300U40-1

A23-3300U40-1

WEDNESDAY, 15 NOVEMBER 2023 – MORNING

MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
INTERMEDIATE TIER

1 hour 45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**2**	
2.	**2**	
3.	**5**	
4.	**2**	
5.	**4**	
6.	**2**	
7.	**3**	
8.	**6**	
9.	**2**	
10.	**4**	
11.	**5**	
12.	**2**	
13.	**4**	
14.	**6**	
15.	**4**	
16.	**4**	
17.	**4**	
18.	**3**	
19.	**3**	
20.	**2**	
21.	**5**	
22.	**6**	
Total	**80**	

ADDITIONAL MATERIALS

A calculator will be required for this examination.

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the questions correctly.

Take π as 3·14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

In question **8**, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

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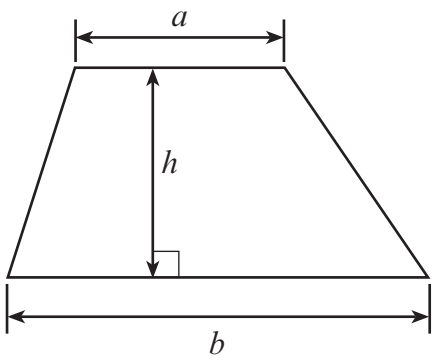
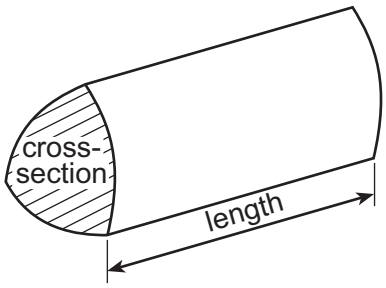
Formula List – Intermediate Tier

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



Volume of prism = area of cross-section × length



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1. (a) What is 2 litres approximately equal to?
Circle your answer. [1]

2 pints 3 pints 3·5 pints 4·4 pints 200 pints

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(b) What is 32 km approximately equal to?
Circle your answer. [1]

16 miles 20 miles 32 miles 51 miles 64 miles

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2. (a) A pencil case contains some pens.
One pen is chosen at random.
The probability that the chosen pen is blue is 45%.
What is the probability that the chosen pen is **not blue**? [1]

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(b) Dewi throws a fair six-sided dice.
What is the probability that Dewi throws a prime number?
Circle your answer. [1]

$\frac{1}{6}$ $\frac{1}{2}$ $\frac{5}{6}$ $\frac{1}{3}$ $\frac{2}{3}$

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3. (a) Solve the equation $8a + 3 \cdot 5 = 27 \cdot 5$. [2]

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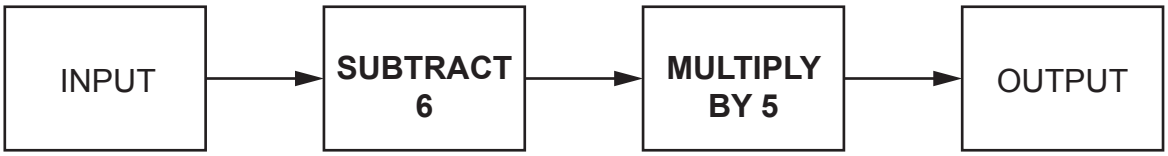
(b) A number machine is shown below.



(i) Calculate the OUTPUT when the INPUT is 1·5. [1]

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(ii) Write down an expression for the OUTPUT when the INPUT is n. [2]

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4. A **decimal** number is written on a card.
You have three clues to help you work out the number on the card.

Clue 1: The number is between 5 and 12 inclusive.
Clue 2: The number is a multiple of 2·3.
Clue 3: The square of the number is greater than 50 but less than 120.

What is the decimal number on the card? [2]

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The decimal number on the card = ...

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5. (a) Evaluate $\dfrac{18 \cdot 4^3 + 8 \cdot 79}{7 \cdot 3^2}$.

Give your answer correct to the nearest 10. [2]

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(b) Evaluate $\sqrt{1456} \times 3 \cdot 7$.

Give your answer correct to 1 decimal place. [2]

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6. Kamal worked for a total of 36 hours in one week.
On Monday, Tuesday and Wednesday, he worked the same number of hours each day.
On both Thursday and Friday, he worked for half as long as he did on any of the first three days.
He did not work on Saturday or Sunday.

How many hours did Kamal work for on Friday? [2]

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Kamal worked for ..... hours on Friday

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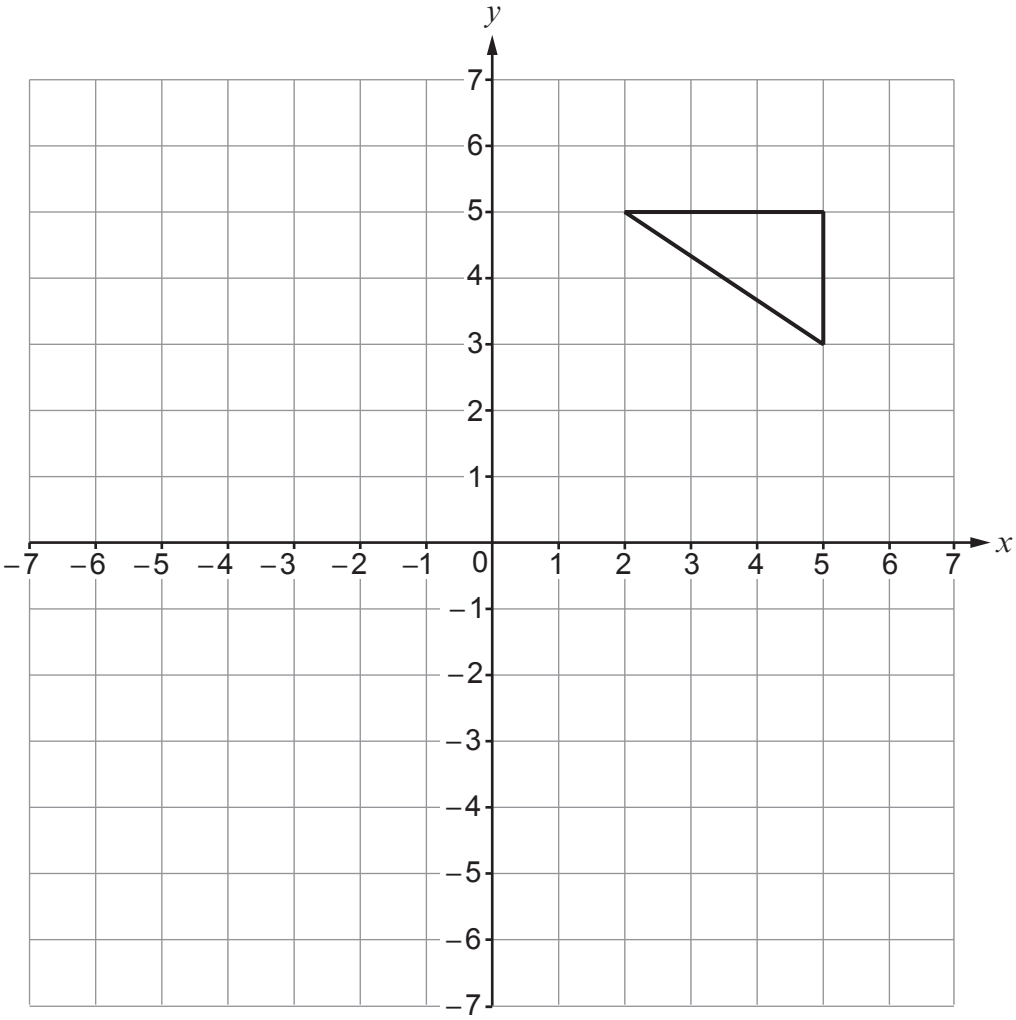
7. (a) Translate the triangle 6 squares to the left and 2 squares down. [1]



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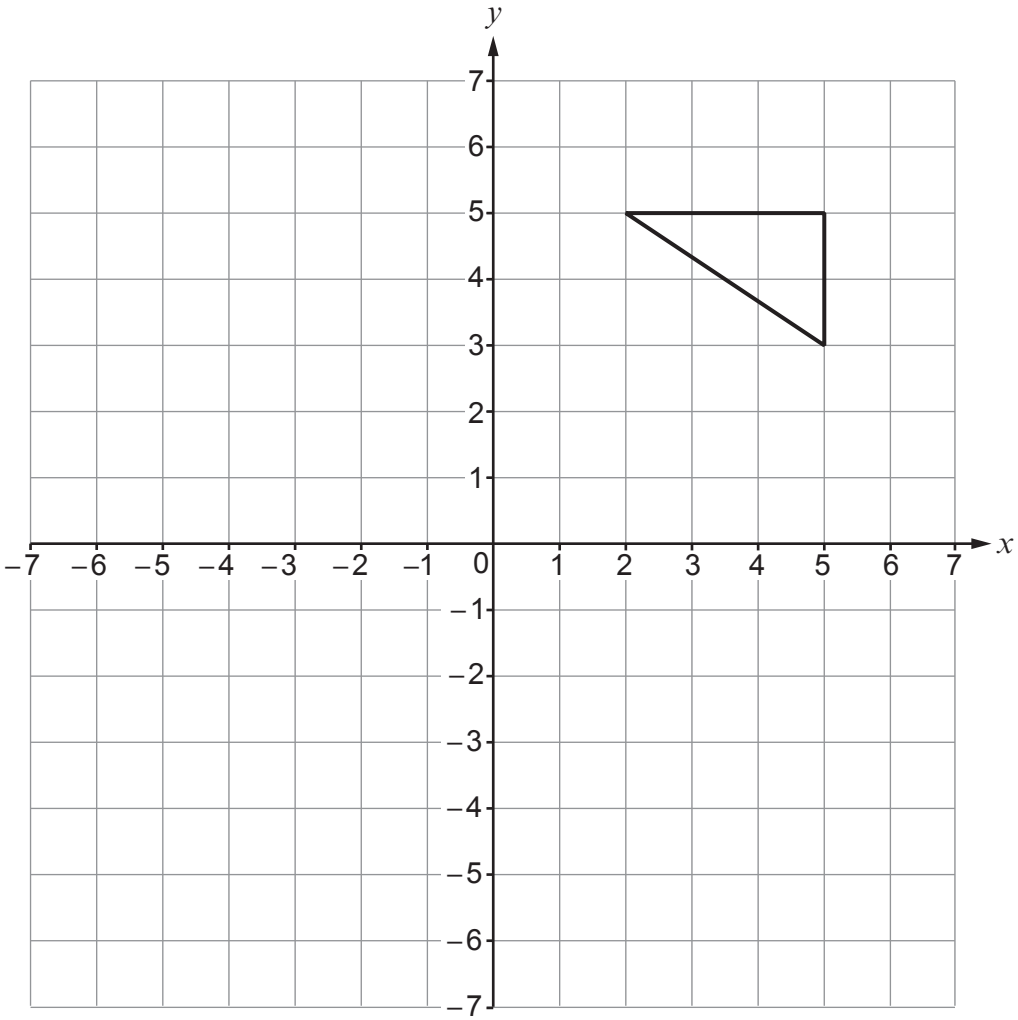
(b) Reflect the triangle in the line $y = 1$. [2]



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8. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

The shape below has a total length of 35 cm.
The shape is cut into three parts, A, B and C.

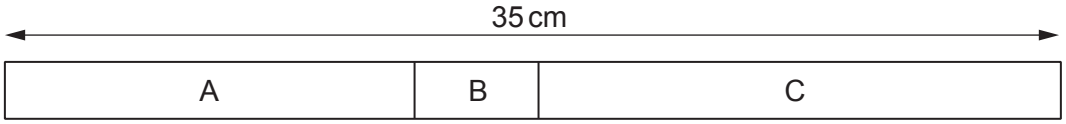

Diagram not drawn to scale

The length of A is $\frac{2}{5}$ of the total length of the shape.

The lengths of B and C are in the ratio 1 : 6.

Find the length of **each** part of the shape.
You must show all your working. [4 + 2 OCW]

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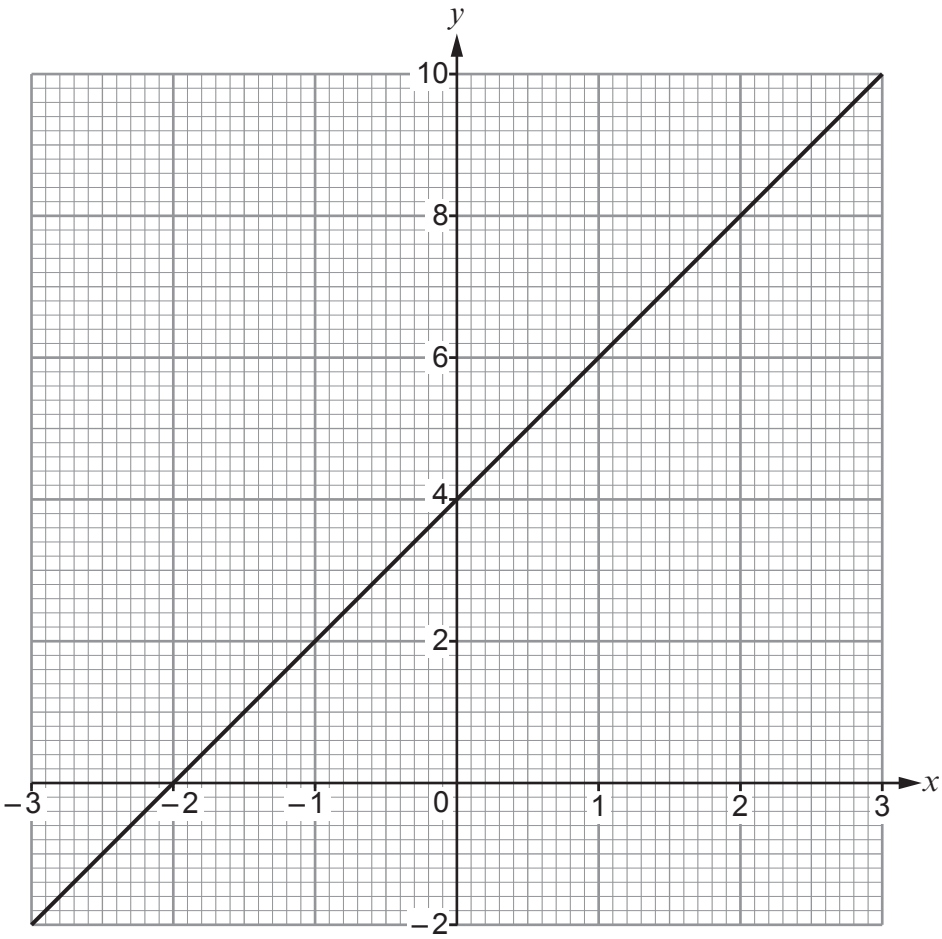
9. The diagram below shows the graph of the straight line $y = 2x + 4$ for values of x from –3 to 3.



(a) Draw the line $x = 2$ on the graph paper. [1]

(b) Write down the coordinates of the point where the lines $y = 2x + 4$ and $x = 2$ intersect. [1]

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The coordinates of the point where $y = 2x + 4$ and $x = 2$ intersect = (..... , ...)

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10. The table below shows the percentages of different amounts.
Three values have been calculated.

Complete the table. [4]

		Amount	
		£36	**£** .....
Percentage	..... **%**	£3.60	£9.20
	13·5%	£	£12.42

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11. The diagram shows two circles that fit in a rectangle.
The centre of the small circle is directly below the centre of the large circle.
The diameter of the small circle is 8 cm.
The **radius** of the large circle is 2 cm greater than the **radius** of the small circle.

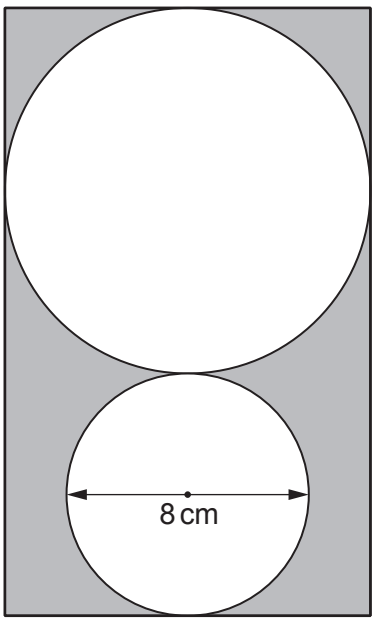

Diagram not drawn to scale

Calculate the total area of the shaded parts of the rectangle. [5]

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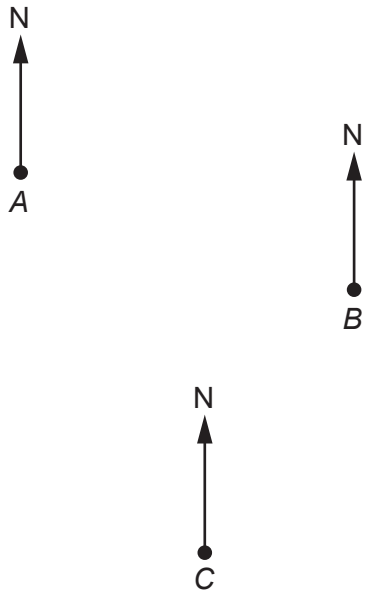
12. The diagram below shows the positions of three points *A*, *B* and *C* on a map.
The diagram is drawn to scale.



(a) Find the bearing of *B* from *A*. [1]

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(b) Find the bearing of *A* from *C*. [1]

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13. The table below shows some of the values of $y = x^2 + 4x + 5$ for values of x from –4 to 1.

x	–4	–3	–2	–1	0	1
$y = x^2 + 4x + 5$	5	2		2	5	

(a) Complete the table by finding the value of y for $x = -2$ and for $x = 1$. [2]

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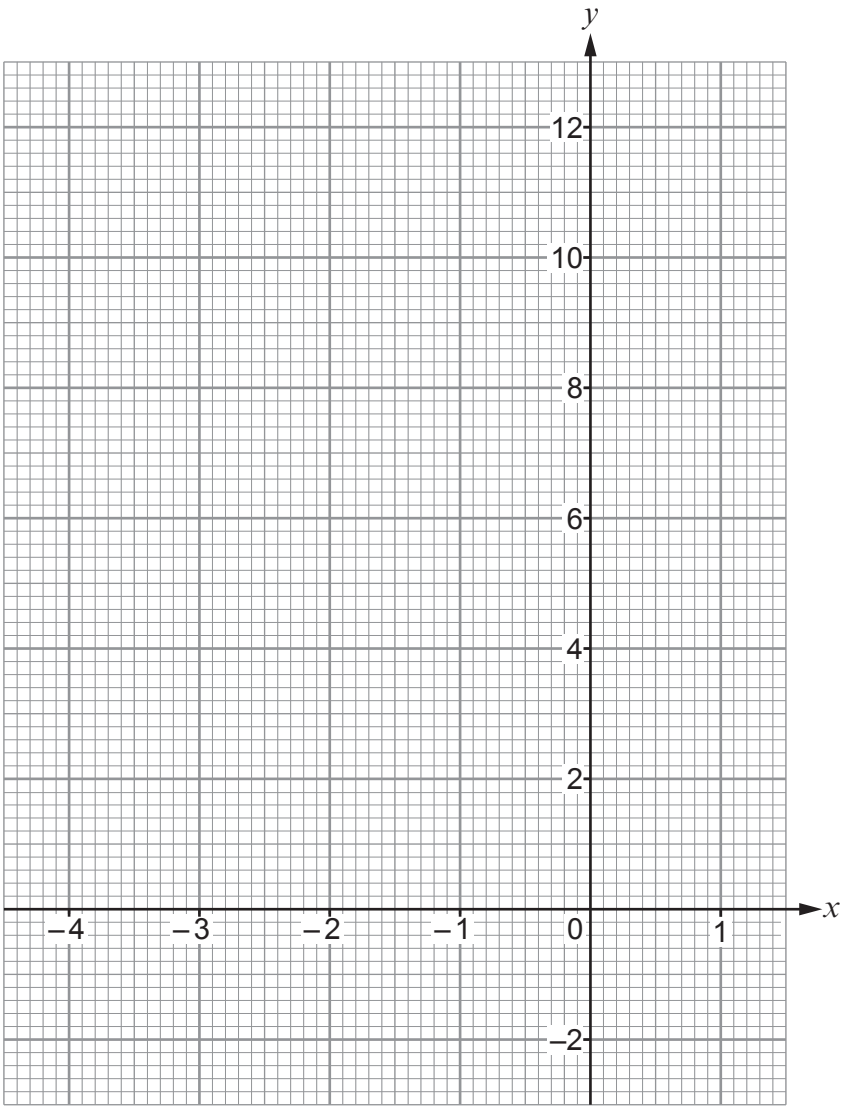
(b) On the graph paper below, draw the graph of $y = x^2 + 4x + 5$ for values of x from –4 to 1. [2]



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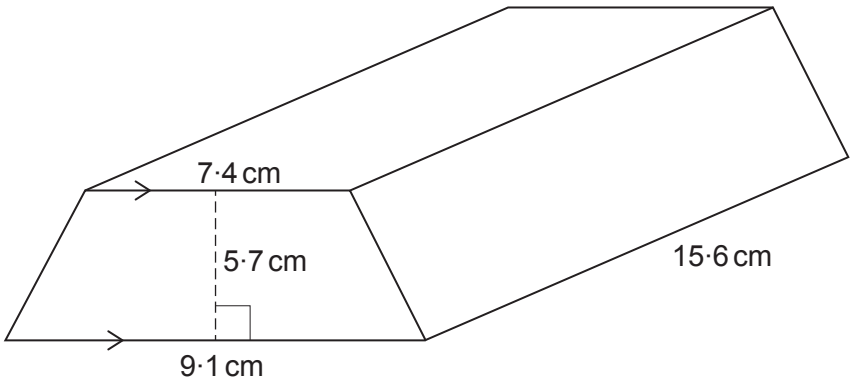

Diagram not drawn to scale

(a) Find the volume of the solid prism shown above. [3]

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(b) The solid prism is made of gold.
Gold has a density of 19·3 g/cm^3.

Calculate the mass of the prism.
Give your answer in **kilograms**. [3]

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Mass of the prism = ... **kg**

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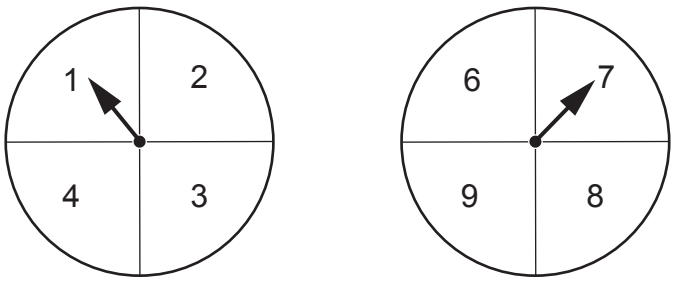
15. Vera has two fair spinners.
Each spinner is divided into quarters.
One spinner shows the values 1, 2, 3 and 4.
The other spinner shows the values 6, 7, 8 and 9.



Vera spins the two spinners. She then multiplies the two values together to form a product.
For example, the diagram above forms the product $1 \times 7 = 7$.

Consider the ways in which all the possible products can be formed.
Calculate the probability that the spinners will form a product that is a factor of 36.
You must show all your working to justify your answer. [4]

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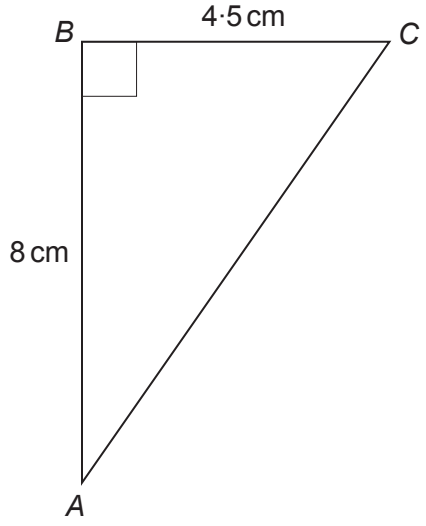

Diagram not drawn to scale

Calculate the length of the side *AC*.
Give your answer correct to 3 significant figures. [4]

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17. A solution of the equation

$$x^3 + 6x = 80$$

lies between 3 and 4.

Use the method of trial and improvement to find this solution correct to 1 decimal place.
You must show all your working. [4]

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18. The diagram below shows a shape made by joining two congruent rectangles together.
The length of each rectangle is $(5x+3)$ cm.
The width of each rectangle is $(2x-1)$ cm.

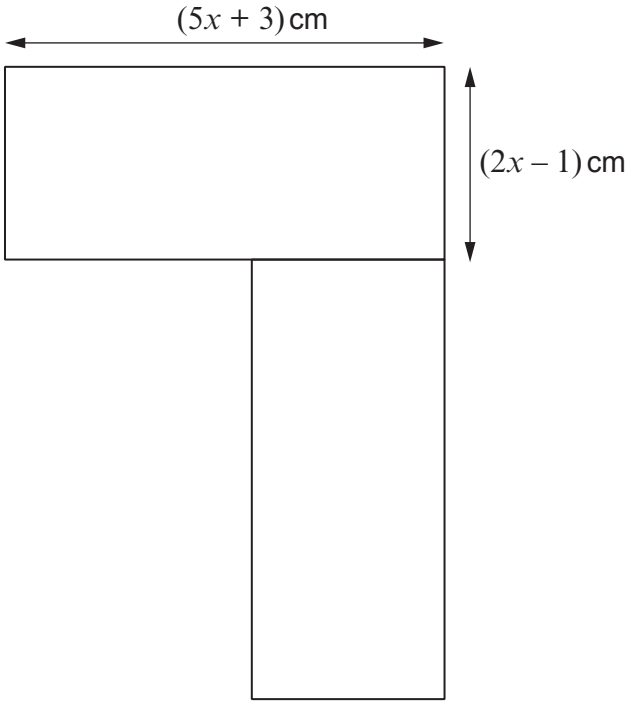

Diagram not drawn to scale

Write an expression for the total area of the shape in the form $ax^2 + bx + c$, where a, b and c are whole numbers. [3]

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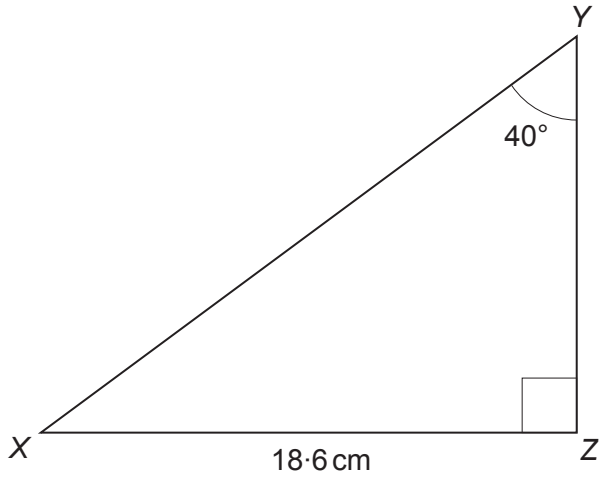

Diagram not drawn to scale

Calculate the length of the side *YZ*. [3]

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20. 7 cubes are stacked on top of each other.
Each of these cubes has edges of length 60 mm, measured correct to the nearest millimetre.

Calculate the greatest possible height of this stack of 7 cubes. [2]

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21. The grouped frequency table below shows data for 32 values of t.
One of the frequencies in the table is represented by a.

t	Frequency
$20 \leqslant t < 30$	2
$30 \leqslant t < 40$	8
$40 \leqslant t < 50$	4
$50 \leqslant t < 60$	a
$60 \leqslant t < 70$	3
$70 \leqslant t < 80$	5

Find the estimated mean value of t for the 32 values. [5]

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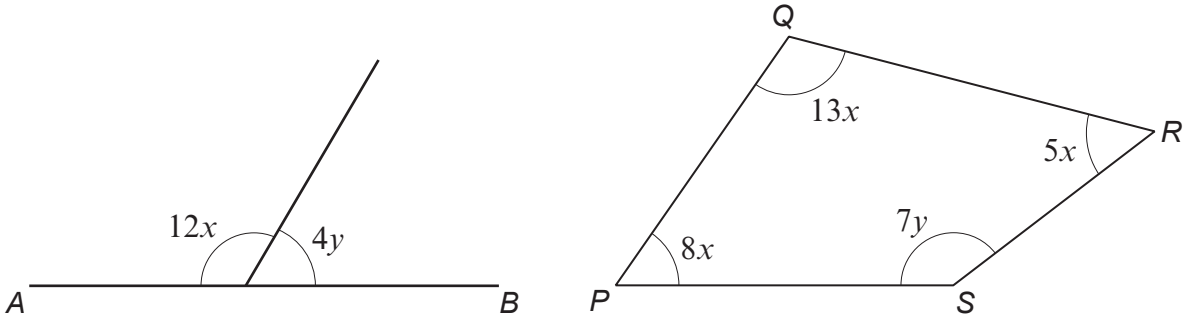
22. *AB* is a straight line.
PQRS is a quadrilateral.
Each angle is given in terms of x or y.



Diagrams not drawn to scale

Use an algebraic method to find the value of x and the value of y. [6]

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x = ... and y = ...

END OF PAPER

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Question number	Additional page, if required. Write the question number(s) in the left-hand margin.	Examiner only

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