OCR
Oxford Cambridge and RSA

F

# Friday 6 November 2015 – Morning

## GCSE MATHEMATICS B

**J567/02** Paper 2 (Foundation Tier)

Candidates answer on the Question Paper.

**OCR supplied materials:**
None

**Other materials required:**
- Geometrical instruments
- Tracing paper (optional)
- Scientific or graphical calculator

**Duration:** 1 hour 30 minutes

* J 5 6 7 0 2 *

* 4 8 2 9 4 7 6 7 3 9 *

| Candidate forename | | Candidate surname | |
|---|---|---|---|

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

**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

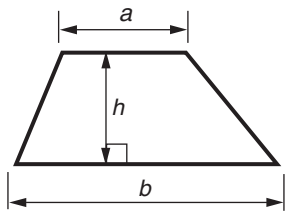
**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Use the $\pi$ button on your calculator or take $\pi$ to be 3.142 unless the question says otherwise.
- The quality of written communication is assessed in questions marked with an asterisk (*).
- The total number of marks for this paper is **100**.
- This document consists of **28** pages. Any blank pages are indicated.

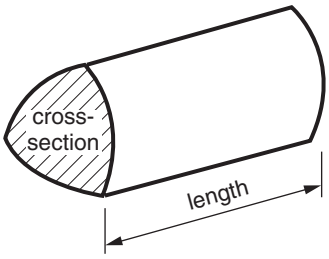
**You are permitted to use a calculator for this paper**

## Formulae Sheet: Foundation Tier

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




**Volume of prism** = (area of cross-section) × length

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Answer **all** the questions.

**1** Here is a list of numbers.

7 13 16 21 27 36 45 65 84

From this list write down a number which

**(a)** is a cube,

**(a)** ..... **[1]**

**(b)** has 3 **and** 5 as factors,

**(b)** ..... **[1]**

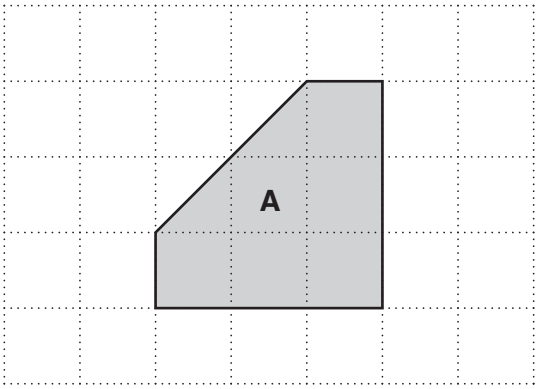
**(c)** is a prime number **and** is a factor of 42,

**(c)** ..... **[1]**

**(d)** is a square **and** is a multiple of 6.

**(d)** ..... **[1]**

**2** Shape **A** is drawn on a one-centimetre square grid.




**(a)** What is the mathematical name of shape **A**?
Choose from the words in this box.

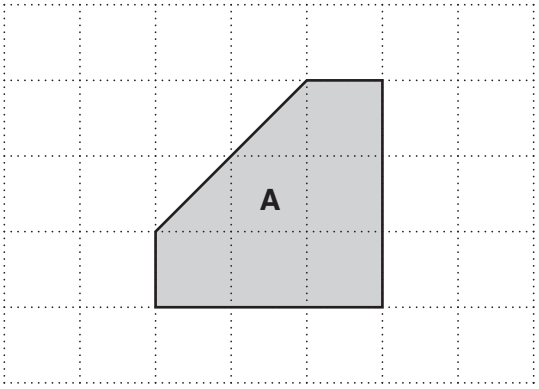
| parallelogram | pentagon | hexagon | trapezium |
|---|---|---|---|

**(a)** ..... **[1]**

**(b)** Work out the area of shape **A**.

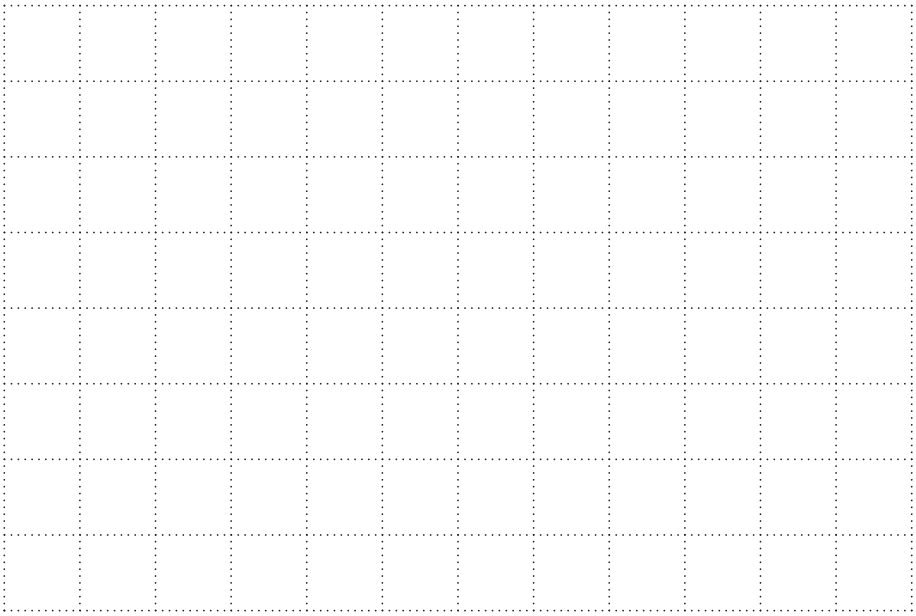
**(b)** ..... $cm^2$ **[1]**

**(c)** On the grid below, draw any lines of symmetry of shape **A**.



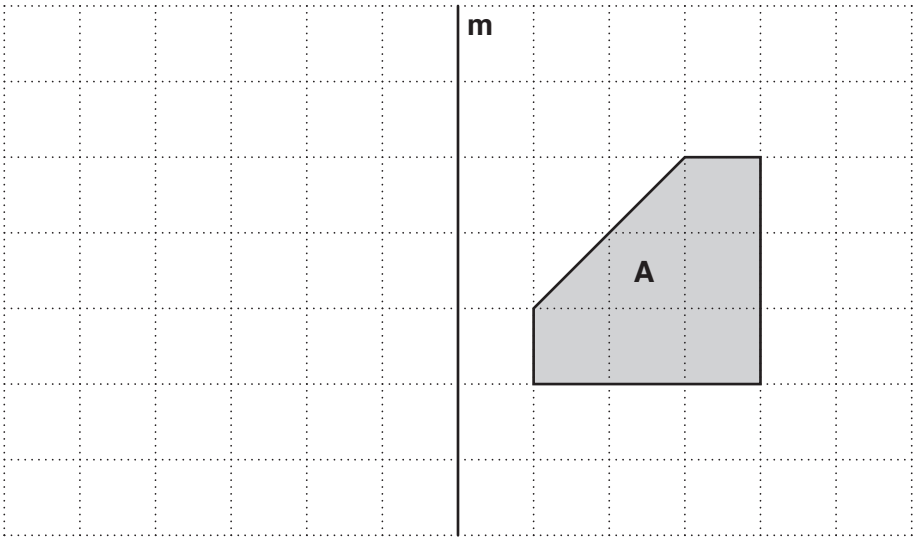

**[1]**

**(d)** On the grid below, draw an enlargement of shape **A** with scale factor 2.



**[2]**

**(e)** On the grid below, reflect shape **A** in the line **m**.




**[2]**

**3** This is a one-centimetre square grid.

On the grid above draw a **quadrilateral** which has:

- an area of 6 $cm^2$
- **only** one line of reflection symmetry. **[3]**

**4** Lottie is making cakes for a party.
She is going to make cupcakes and chocolate rolls.

| **Ingredients for 12 cupcakes** | |
|---|---|
| Butter | 100 g |
| Flour | 150 g |
| Sugar | 150 g |
| Milk | 2 tablespoons |
| Eggs | 2 |
| Icing | |

| **Ingredients for 1 chocolate roll** | |
|---|---|
| Sugar | 100 g |
| Flour | 65 g |
| Cocoa powder | 35 g |
| Eggs | 4 |
| Jam | |
| Cream | |

She only has 1 kilogram of flour.
She has plenty of all the other ingredients.
She makes 30 cupcakes.
She then makes as many chocolate rolls as she can.

How many chocolate rolls does she make?

..... **[5]**

**5** **(a)** Jason goes shopping in a supermarket.

| | | | |
|---|---|---|---|
| litres | kilograms | millimetres | milligrams |
| kilometres | millilitres | grams | metres |

Complete his shopping list using words from the box above.

| | | |
|---|---|---|
| Bag of potatoes | 2.5 | ..... |
| Orange juice | 750 | ..... |
| Kitchen foil | 20 | ..... |

**[3]**

**(b)** In the supermarket the prices of some products have been reduced.

**(i)** *Crunch* biscuits are reduced by a third.
The original price of these biscuits was £1.95.

How much have *Crunch* biscuits been reduced by?

**(b)(i)** £ ..... **[2]**

**(ii)** *Disappear* stain remover is reduced by 12%.
The original price of this stain remover was £9.40.

How much has *Disappear* stain remover been reduced by?
Give your answer correct to the nearest penny.

**(ii)** £ ..... **[3]**

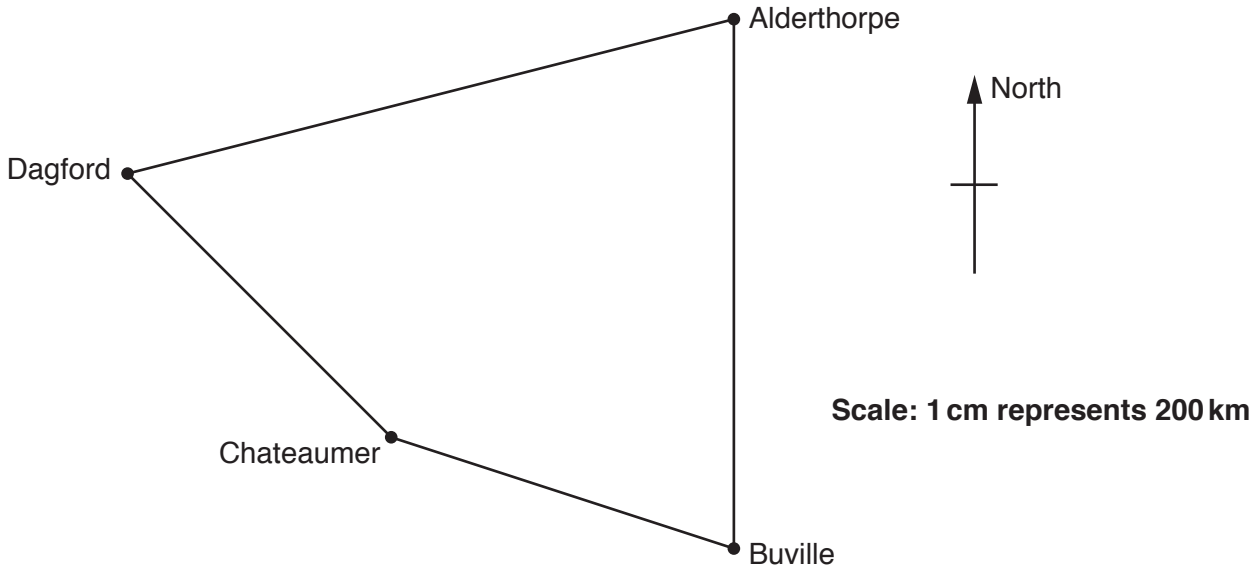
**(c)** In the supermarket a 2-litre container of *Meadowsweet* milk costs £1.18.
A 4-pint container of *Moat Farm* milk costs £1.40.

1 litre = 1.76 pints.

Which container is the best value for money?
Show calculations to justify your answer.

**(c)** ..... **[4]**

**6** This map shows part of an aeroplane network.




**(a)** Jade flies from Alderthorpe to Buville.

**(i)** In what compass direction is Jade travelling?

**(a)(i)** ..... **[1]**

**(ii)** How far is her journey?

Give your answer in kilometres.

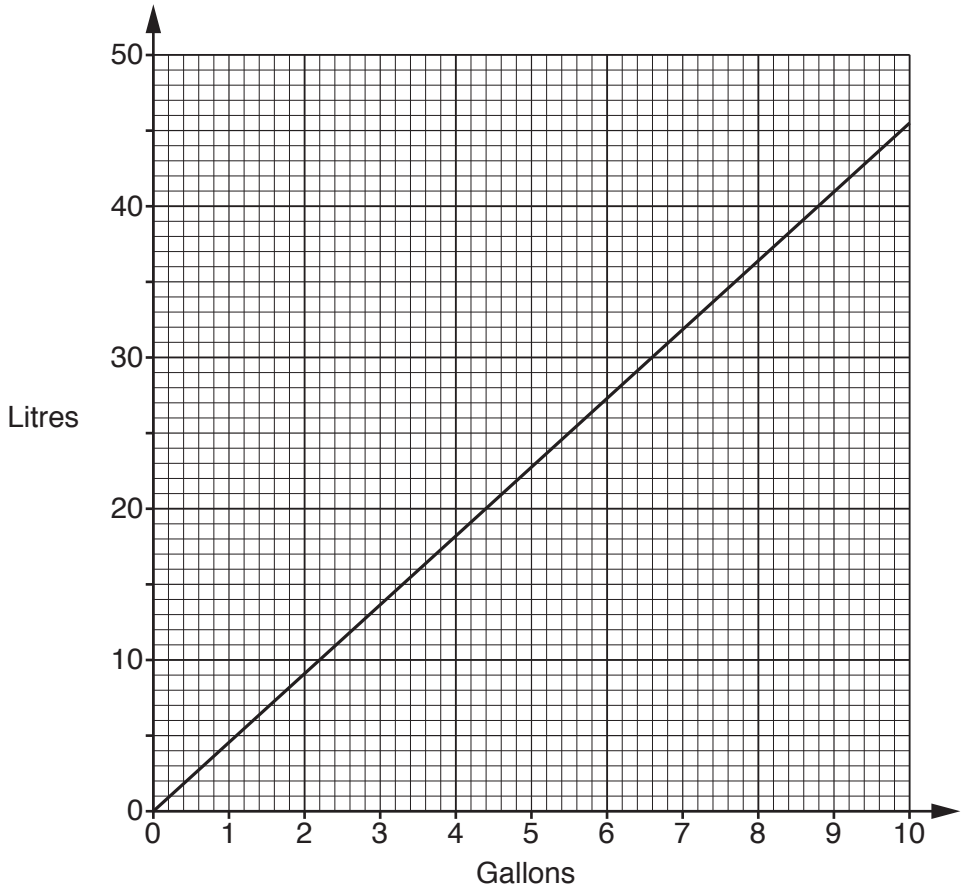
**(ii)** ..... km **[2]**

**(b)** Toby flies from Chateaumer to Dagford.

In what compass direction is Toby travelling?

**(b)** ..... **[1]**

**7** This is a conversion graph between gallons and litres.




**(a)** Use the graph to convert 4 gallons into litres.

**(a)** ..... litres **[1]**

**(b)** Use the graph to convert 38 litres into gallons.

**(b)** ..... gallons **[1]**

**(c)** Jake puts 80 litres of diesel into the tank of his lorry.

Use the graph to convert 80 litres into gallons, showing your method.

**(c)** ..... gallons **[2]**

**8** **(a)** Here are the first five terms in two sequences.

What is the next term in each of these sequences?

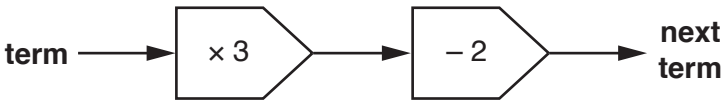
**(i)** 3 6 12 24 48

**(a)(i)** ..... **[1]**

**(ii)** 3 4 7 12 19

**(ii)** ..... **[1]**

**(b)** This is a rule for finding the next term in a sequence.




**(i)** The second term in a sequence using this rule is 13.

What is the **third** term in this sequence?

**(b)(i)** ..... **[1]**

**(ii)** The sixth term in a **different** sequence using this rule is 154.

What is the **fifth** term in this sequence?

**(ii)** ..... **[2]**

**(iii)** The first term in **another** sequence using this rule is 1.

Describe the sequence.

..... **[1]**

**9** Moeen, Thea and Layla are in a French class that does a test every week.

**(a)** These are the scores in Moeen's first five tests.

4 6 5 2 6

After he has completed his sixth test the **range** of Moeen's scores is 7.

What score did Moeen get in his sixth test?

**(a)** ..... **[1]**

**(b)** These are the scores in Thea's first five tests.

3 8 9 4 2

After she has completed her sixth test the **median** of Thea's scores is 5.5.

What score did Thea get in her sixth test?

**(b)** ..... **[2]**

**(c)** These are the scores in Layla's first five tests.

5 7 5 2 4

After she has completed her sixth test the **mean** of Layla's scores is 4.5.

What score did Layla get in her sixth test?

**(c)** ..... **[2]**

**10** Change

**(a)** 35% to a fraction in its lowest terms,

**(a)** ..... **[2]**

**(b)** $\frac{9}{10}$ to a percentage,

**(b)** ..... % **[1]**

**(c)** $\frac{3}{25}$ to a percentage.

**(c)** ..... % **[2]**

**11** Work out.

**(a) (i)** $15 - 3 \times 2$

**(a)(i)** ..... **[1]**

**(ii)** $4 \times (3 + 6)$

**(ii)** ..... **[1]**

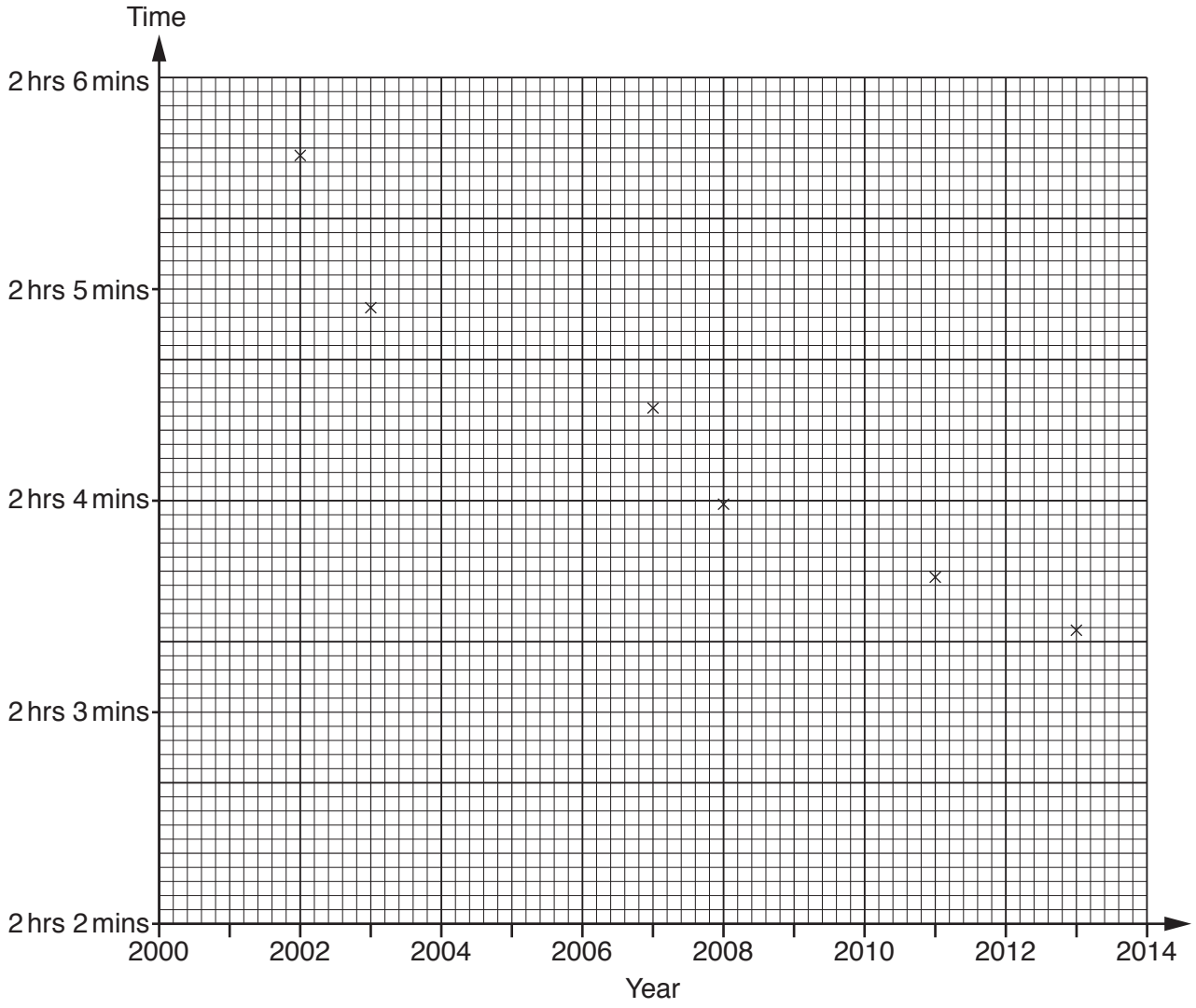
**(b) (i)** $3^2 + \sqrt{49}$

**(b)(i)** ..... **[2]**

**(ii)** $2^5$

**(ii)** ..... **[2]**

**12** This graph shows the times of world records in marathons and the year in which they were set between 2000 and 2013.




The graph shows that a new world record was set in 2007 with a time of 2 hours 4 minutes 26 seconds.

**(a)** In which year did the world record for the marathon first fall below 2 hours 5 minutes?

**(a)** ..... **[1]**

**(b)** How many years did it take for the world record to fall by over one minute from the world record set in 2002?

**(b)** ..... **[1]**

**(c)** Complete the time of the world record for the marathon set in 2011.

**(c)** 2 hours ..... minutes ..... seconds **[1]**

**(d)** How much quicker was the world record for the marathon set in 2011 compared with the world record in 2007?

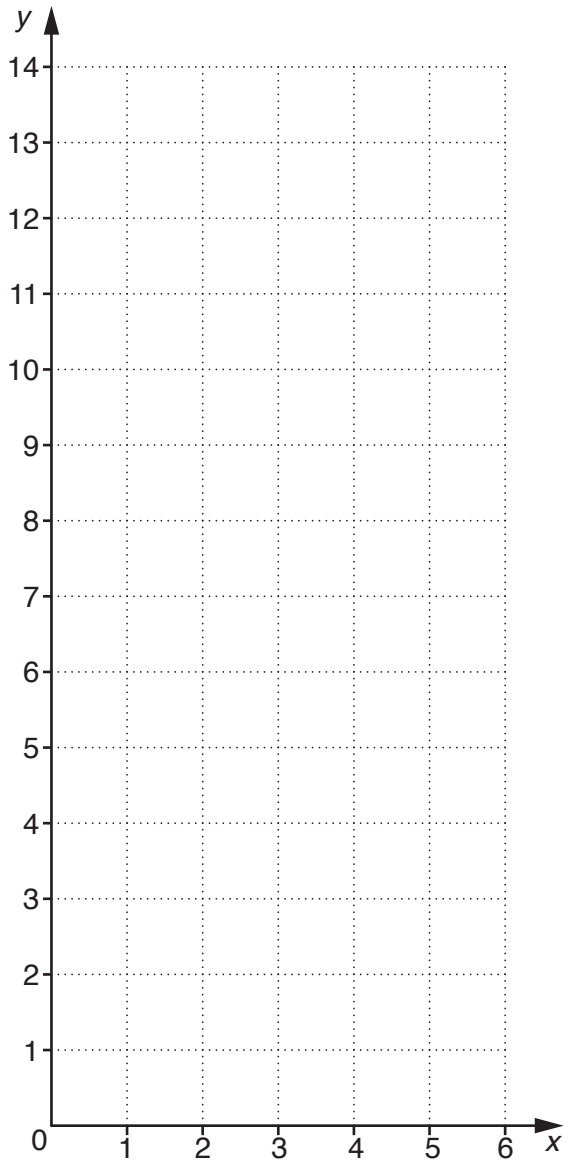
**(d)** ..... seconds **[1]**

**13 (a)** Complete the table for $y = 2x + 1$.

| $x$ | 1 | 3 | 5 |
|---|---|---|---|
| $y$ | | 7 | |

**[1]**

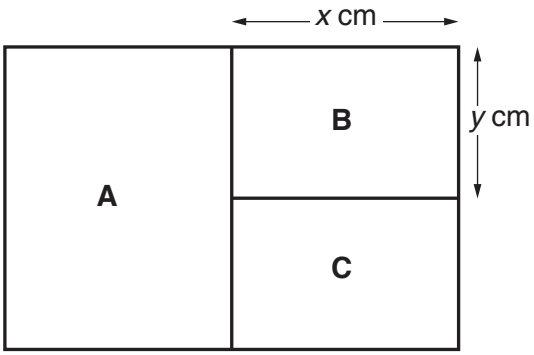
**(b)** Draw the graph of $y = 2x + 1$ on the grid below.




**[2]**

**14** Shape 1 is made from three rectangles **A**, **B** and **C**.

**shape 1**




**Not to scale**

Rectangle **C** is identical to rectangle **B**.
Rectangle **A** has twice the area of rectangle **B**.

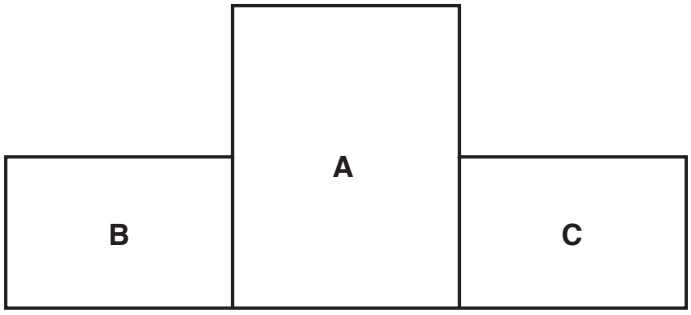
Rectangle **B** has length $x$cm and width $y$cm.

**(a)** Write down an expression for the perimeter of shape 1.
Give your answer in its simplest form.

**(a)** ..... cm **[2]**

**(b)** Shape 2 is made from the same three rectangles **A**, **B** and **C**.

**shape 2**




**Not to scale**

Write down an expression for the perimeter of shape 2.
Give your answer in its simplest form.

**(b)** ..... cm **[2]**

**15** Solve.

**(a)** $137 = 24 + 2x$

**(a)** $x =$ ..... **[2]**

**(b)** $\frac{x}{4} + 9 = 6$

**(b)** $x =$ ..... **[2]**

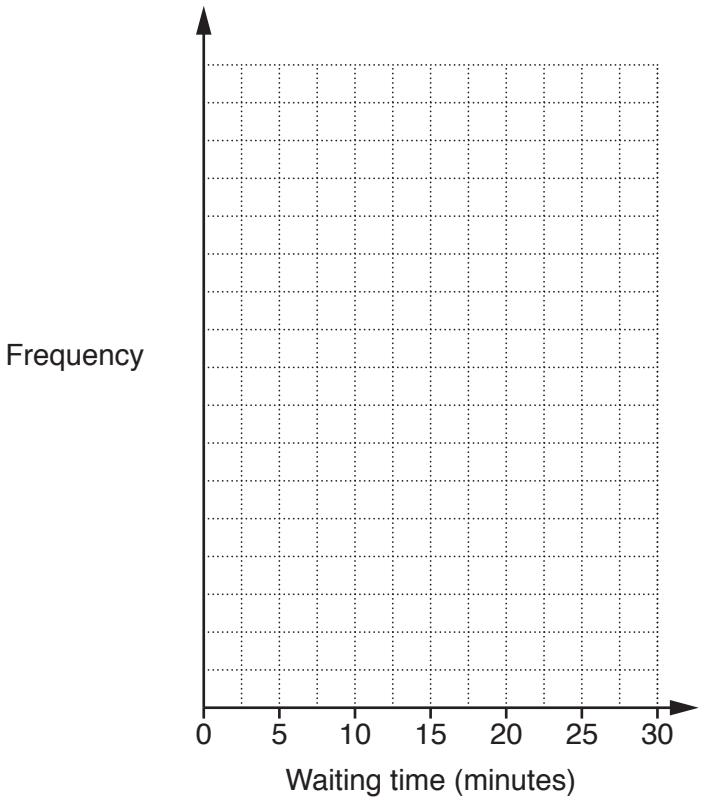
**16** The dentists in a surgery keep a record of the waiting time for each patient.
The waiting times for one Monday are summarised in the table.

| **Waiting time (*t* minutes)** | **Frequency** | | |
|---|---|---|---|
| $0 < t \leqslant 5$ | 12 | | |
| $5 < t \leqslant 10$ | 15 | | |
| $10 < t \leqslant 15$ | 16 | | |
| $15 < t \leqslant 20$ | 9 | | |
| $20 < t \leqslant 25$ | 5 | | |
| $25 < t \leqslant 30$ | 3 | | |

**(a)** Calculate an estimate of the mean waiting time.

**(a)** ..... minutes **[4]**

**(b)** Draw a frequency polygon to display the waiting times data.




**[3]**

**(c)** Write down the modal class of the waiting times.

**(c)** ..... **[1]**

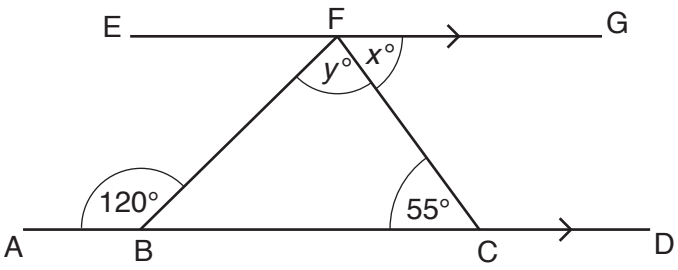
**(d)** The dentists have a target of fewer than 25% of patients waiting more than 15 minutes.

Did they meet their target on Monday? Show how you decide.

..... because .....

..... **[2]**

**17** **(a)** In the diagram, ABCD is parallel to EFG.
Angle BCF = 55° and angle ABF = 120°.




**Not to scale**

**(i)** Complete the sentence with a reason.

$x = 55°$ because ..... **[1]**

**(ii)** Work out $y$.

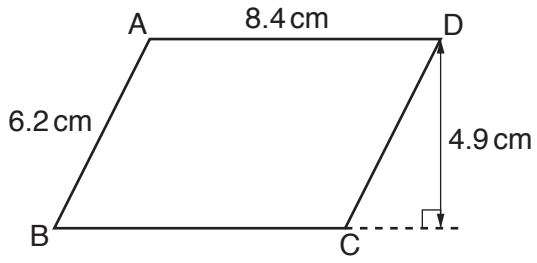
**(a)(ii)** .....° **[2]**

**(b)** An angle is measured as 27° correct to the nearest degree.

Write down the smallest possible size of the angle.

**(b)** .....° **[1]**

**18** The diagram shows a parallelogram ABCD.




**Not to scale**

Work out the area of the parallelogram.

..... $cm^2$ **[2]**

**19** Pavel has a pack of cards.
Each card has a picture of either a square, a circle or a triangle.
Each picture is either black or white.
Pavel takes one of the cards from the pack at random.
Some probabilities for this are shown in the table.

| | **Square** | **Circle** | **Triangle** |
|---|---|---|---|
| **Black** | 0.24 | | 0.04 |
| **White** | 0.12 | 0.20 | 0.08 |

**(a)** Complete the table. **[2]**

**(b)** Find the probability that Pavel's card has a picture of a square.

**(b)** ..... **[1]**

**20*** A water tank is in the shape of a cylinder.
It has diameter 0.44 m and height 1.2 m.
Water flows into the tank at a rate of 20 litres per minute.
1 litre = 1000 $cm^3$.

John says that it will take about 10 minutes to completely fill the empty tank.
Is he correct? Show calculations to justify your answer. **[5]**

**END OF QUESTION PAPER**

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