OCR
Oxford Cambridge and RSA

# Monday 13 November 2023 – Morning

## GCSE (9–1) Mathematics

**J560/03** Paper 3 (Foundation Tier)

**Time allowed: 1 hour 30 minutes**

**You must have:**
- the Formulae Sheet for Foundation Tier (inside this document)

**You can use:**
- a scientific or graphical calculator
- geometrical instruments
- tracing paper

F

* J 5 6 0 3 *

* 9 9 4 7 6 8 1 8 9 4 *

Please write clearly in black ink. **Do not write in the barcodes.**

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

First name(s) _____

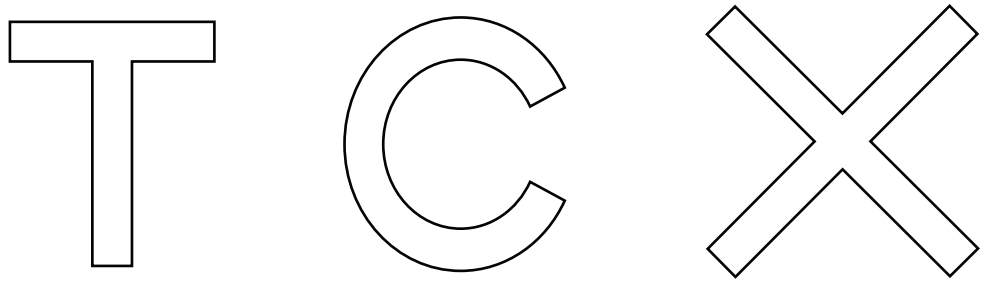
Last name _____

**INSTRUCTIONS**
- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.
- Use the $\pi$ button on your calculator or take $\pi$ to be 3.142 unless the question says something different.

**INFORMATION**
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- This document has **24** pages.

**ADVICE**
- Read each question carefully before you start your answer.

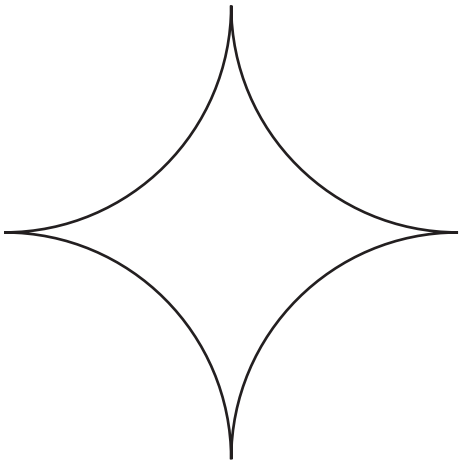
**1** **(a)** For each letter below, draw all the lines of symmetry.



**[3]**

**(b)** This shape is drawn using four quarter circles.

Write down the order of rotation symmetry for the shape.



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

**2** **(a)** In the number 34 752, the digit 4 represents four thousand.

Write in words what the digit 7 represents.

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

**(b)** Write eight million in figures.

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

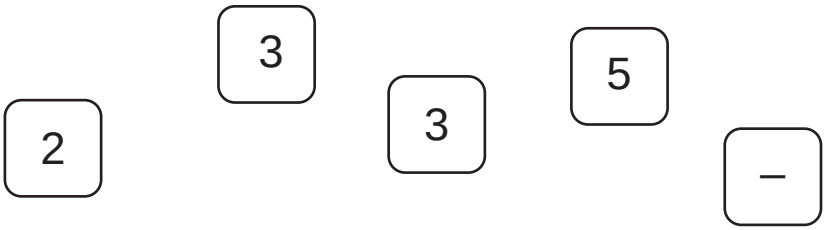
**3** **(a)** What type of numbers are 2, 3 and 5?

Circle **one** answer from the list.

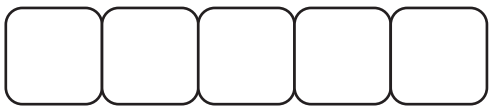
cube numbers  even numbers  odd numbers  prime numbers  square numbers

**[1]**

**(b)** These are five tiles.




**(i)** Arrange the five tiles to make a calculation with the answer 3.




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

**(ii)** Write down a multiple of 8 that can be made using two of the five tiles.

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

**4** A fair spinner has five sides, numbered 1, 2, 3, 4 and 5.

**(a) (i)** Write down the probability of the spinner landing on 2.

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

**(ii)** Write down the probability of the spinner **not** landing on 2.

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

**(b)** Write down an outcome for the spinner that has a probability of 0.

.....

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

**5** Use one of these symbols $<$, $>$ or $=$ to make each statement true.

$0$ ..... $-2$

$3.5$ ..... $\frac{7}{2}$

**[2]**

**6** A family buys a television for £599.
They pay a deposit of £119.
They then pay the rest of the cost in 12 equal payments.

How much is each payment?

£ ..... **[2]**

**7** **(a)** Write this ratio in its simplest form.

4 centimetres : 8 millimetres

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

**(b)** The ratio $4:5$ can be written in the form $1:n$.

Find the value of $n$.

**(b)** $n =$ ..... **[1]**

**8** **(a)** Simplify.

**(i)** $4a + 2a + a$

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

**(ii)** $2x - 3y - 3x + 4$

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

**(b)** Solve.

$p - 5 = -4$

**(b)** $p =$ ..... **[1]**

**9** Insert one pair of brackets into each calculation to make it correct.

$$15 \div 7 - 2 = 3$$

$$5 \times 2 + 3 \times 2 = 26$$

**[2]**

**10** **(a)** Factorise.

$5x - 20$

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

**(b)** Factorise fully.

$14x + 7x^2$

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

**11** Gabi records the number of times a biased six-sided dice lands on each of its numbers.

**(a)** Complete the table to show the relative frequencies.

| **Number on the dice** | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Frequency** | 10 | 21 | 7 | 4 | 3 | 5 |
| **Relative frequency** | | | | | 0.06 | 0.10 |

**[2]**

**(b)** Use Gabi's results to estimate the probability that the spinner lands on 5 or 6.

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

**12** **(a)** Decrease 480 by 20%.

**(a)** ..... **[3]**

**(b)** Alex buys a new phone with 10.5 Gb (Gigabytes) of data.
This is 40% more data than on Alex's old phone.

Work out the amount of data Alex had on the old phone.

**(b)** ..... Gb **[3]**

**13** A student has a pencil case containing 60 pencils.

$\frac{1}{4}$ of the pencils are red.

$\frac{2}{5}$ of the red pencils need sharpening.

Work out how many of the red pencils need sharpening.

..... **[3]**

**14** **(a)** Show that the formula $v = u + at$ can be rearranged to $a = \frac{v - u}{t}$. **[1]**

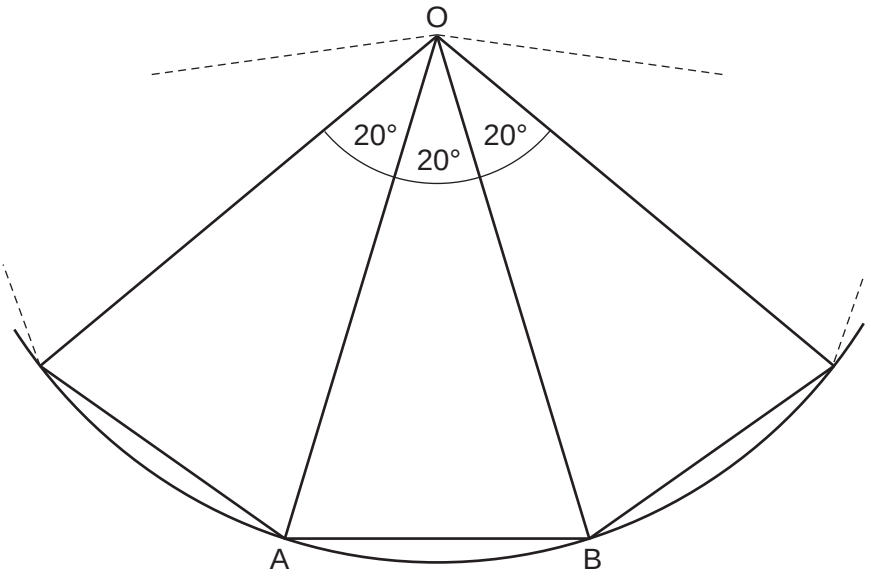
**(b)** Use the formula

$$a = \frac{v - u}{t}$$

to find the acceleration, $a$ m/s$^2$, when a particle takes 4 seconds to increase from an initial velocity of 3 m/s to a final velocity of 9 m/s.

**(b)** $a =$ ..... m/s$^2$ **[2]**

**15** A regular polygon is being constructed inside a circle, centre O.
**Part** of the construction is shown in this diagram.




**Not to scale**

**(a) (i)** Give a reason why OA = OB.

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

**(ii)** Write down the mathematical name of triangle OAB.

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

**(b)** The regular polygon is completed.

Work out the sum of the interior angles of the regular polygon.

**(b)** ..... ° **[3]**

**16** Dev and Emma share some money in the ratio 2 : 3.

**(a)** Dev says

I get $\frac{2}{3}$ of the money.

What mistake has Dev made?
Give the fraction of the money Dev actually receives.

.....

.....

The fraction of the money Dev receives is ..... **[2]**

**(b)** Dev receives £100.

Work out how much money Dev and Emma shared between them.

£ ..... **[3]**

**17** **(a)** Work out the perimeter of this rectangle.


**Not to scale**

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

**(b)** Finley draws a rectangle and says

The perimeter is 20 cm and the length is 10 cm.

Can Finley be correct?
Show how you decide.

..... because .....

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

**18** Nina invests £540 at a simple interest rate of 2% per year.
Kareem invests £540 at a compound interest rate of 2% per year.

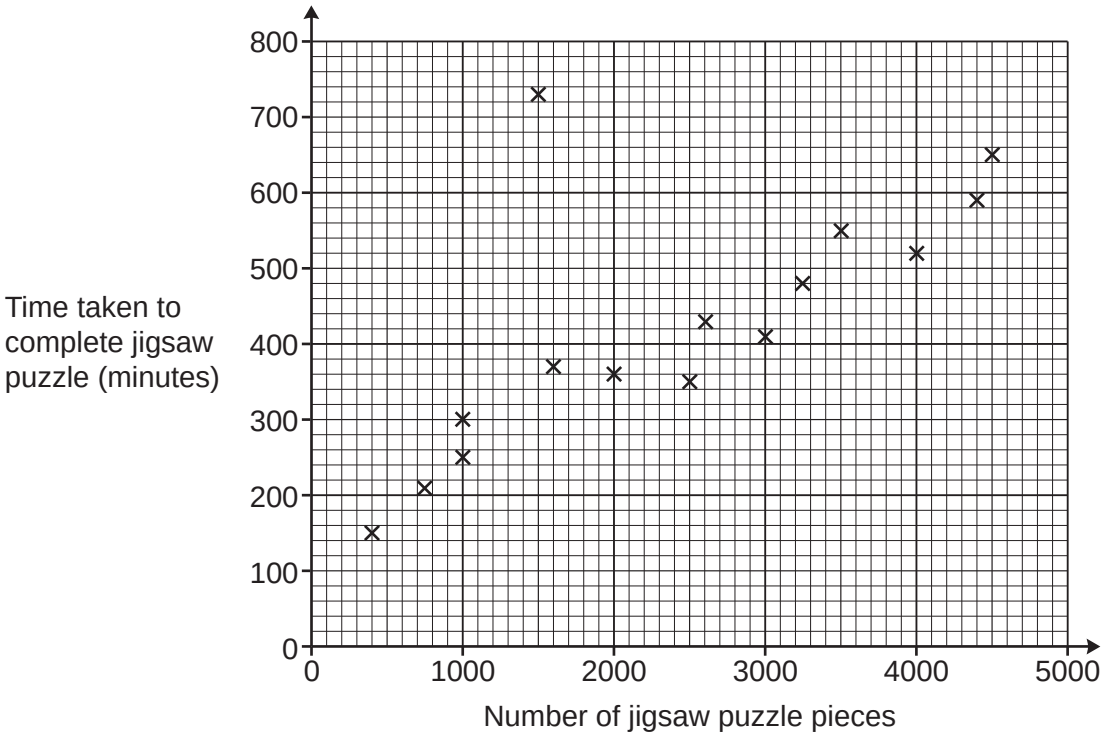
Work out the difference in value between the two investments at the end of 5 years.
You must show your working.

£ ..... **[6]**

**19** Beth completes some jigsaw puzzles and records the following information.

- The number of pieces in the jigsaw puzzle.
- The time taken to complete the jigsaw puzzle, in minutes.

Beth shows this information in a scatter diagram.




**(a)** **(i)** Beth completes two more jigsaw puzzles.

- A 3000 piece jigsaw puzzle taking 460 minutes.
- A 1300 piece jigsaw puzzle taking 320 minutes.

Show this information on the scatter diagram. **[1]**

**(ii)** Describe the type of correlation shown on the scatter diagram.

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

**(b)** One of Beth's jigsaw puzzles was described as "the most difficult jigsaw puzzle you will ever try".

**(i)** Circle the most likely jigsaw puzzle on the scatter diagram. **[1]**

**(ii)** Give a reason why you chose this jigsaw puzzle.

.....

.....

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

**(c)** **(i)** Draw a line of best fit on the scatter diagram. **[1]**

**(ii)** Use your line of best fit to estimate how many pieces are in a jigsaw puzzle that takes Beth 500 minutes to complete.

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

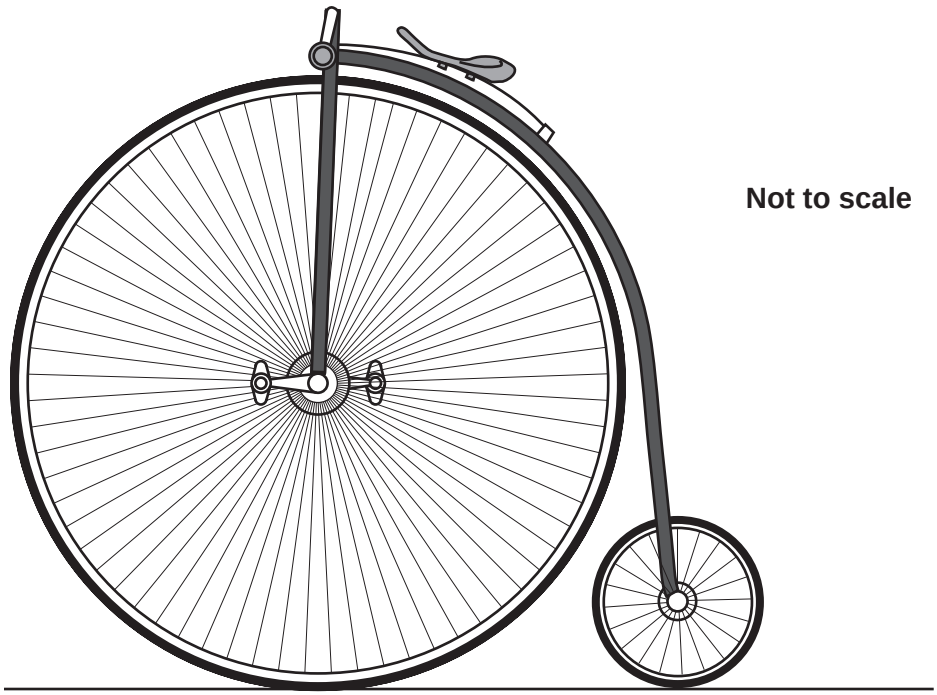
**(d)** Explain why Beth should **not** use her scatter diagram to estimate how long it will take to complete a jigsaw puzzle containing 8000 pieces.

.....

.....

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

**20** The diagram shows a Penny Farthing bicycle.



**Not to scale**

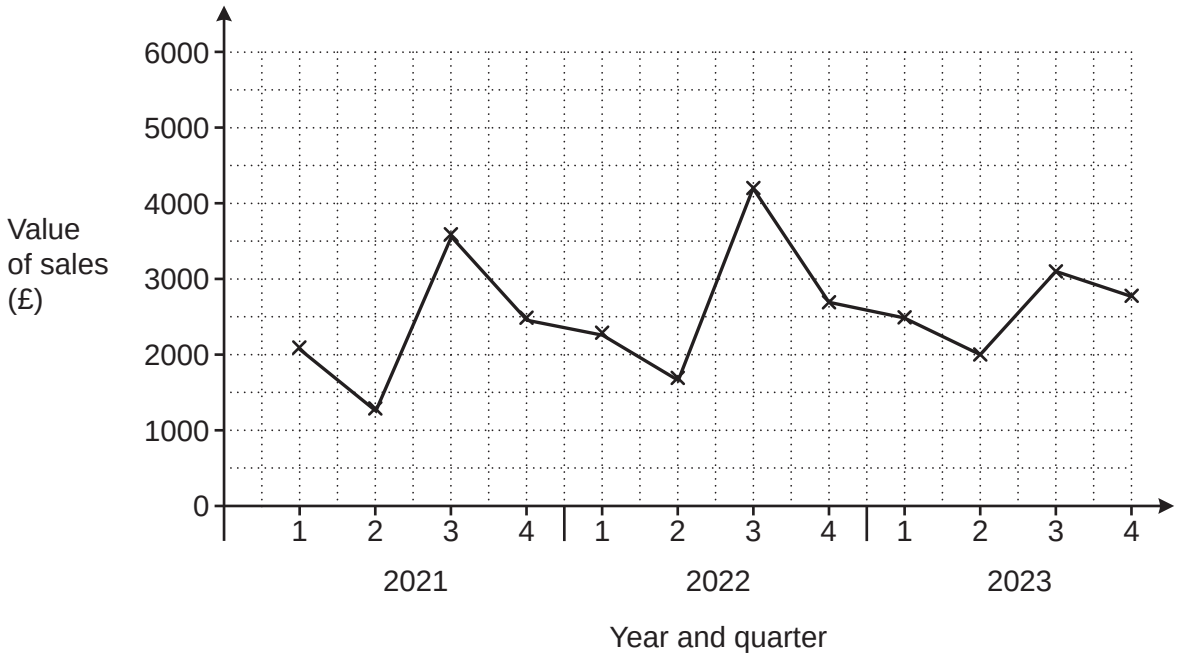
The diameter of the large wheel is 130 cm.
The diameter of the small wheel is 46 cm.

On a short journey, the large wheel makes exactly 69 rotations.
The small wheel also makes an exact number of rotations.

Work out the number of rotations made by the small wheel.

..... **[4]**

**21** The graph shows the value of sunscreen products sold in a shop for each quarter from quarter 1 of 2021 to quarter 4 of 2023.




**(a)** Make **one** comment about the **annual** variation shown in this graph.

.....

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

**(b)** In one of these years, quarter 3 was very cloudy.
Write down which year this is most likely to be.
Give a reason for your answer.

Year ..... because .....

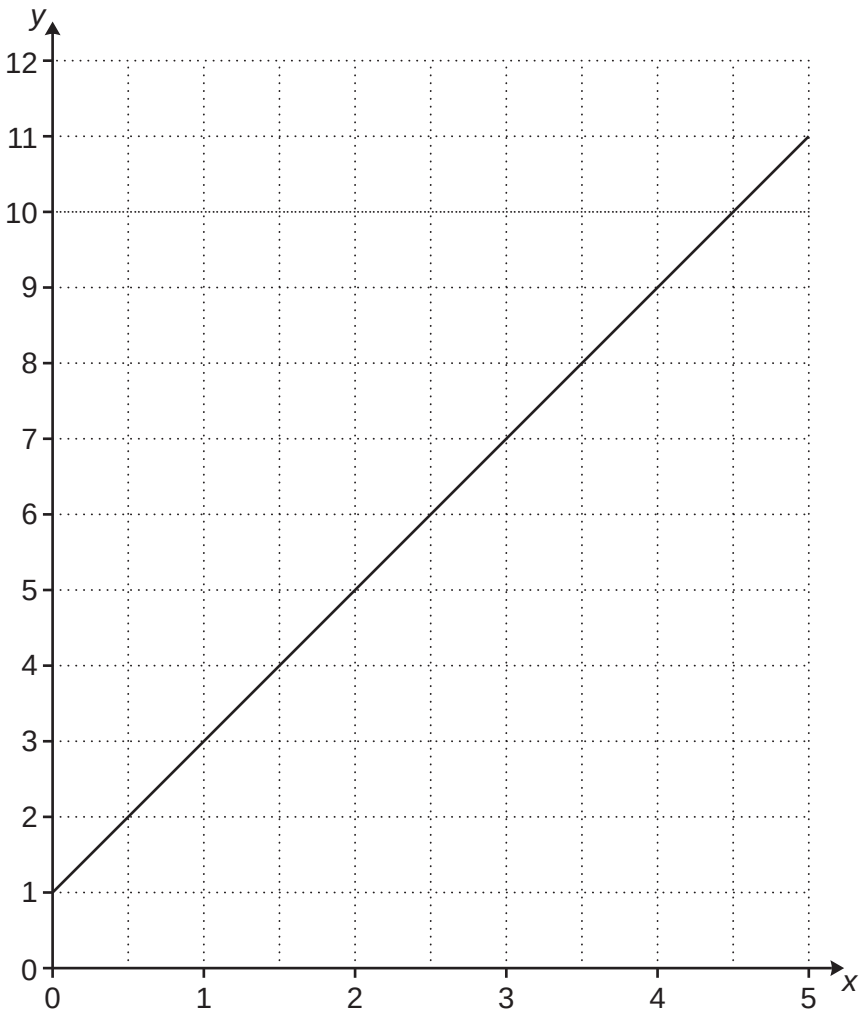
..... **[1]**

**(c)** The manager of the shop says that the value of sales in quarter 4 of 2024 will be £3100.
What assumption has the manager made?

.....

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

**22** Part of the graph of $y = 2x + 1$ is drawn on this grid.




**(a)** Write down the *y*-intercept.

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

**(b)** The line continues to the right.

Will the line pass above, below or through the point (40, 80)?
Show how you decide.

The line $y = 2x + 1$ will pass ..... the point (40, 80) because .....

.....

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

**(c)** Write down the equation of a line that is parallel to $y = 2x + 1$.

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

**23** A number, $r$, is 6.2 when rounded correct to 2 significant figures.
A number, $h$, is 6.2 when truncated to 1 decimal place.

**(a)** Write down a possible value of $r$ that will definitely be less than all possible values of $h$.

**(a)** $r =$ ..... **[1]**

**(b)** Write down a possible value of $h$ that will definitely be greater than all possible values of $r$.

**(b)** $h =$ ..... **[1]**

**(c)** Write down a possible value of $r$ and a possible value of $h$ such that $r$ is greater than $h$.

**(c)** $r =$ ..... and $h =$..... **[1]**

**24** A restaurant menu has 4 main courses and 3 side dishes.
For their meal, each customer chooses 1 main course and 1 side dish.

| Main course | |
|---|---|
| Beef burger | £6 |
| Lasagna | £7 |
| Veggie burger | £5 |
| Turkey stew | £6 |

| Side dish | |
|---|---|
| Salad | £2 |
| Chips | £3 |
| Garlic bread | £1 |

Work out the percentage of possible meals that cost less than £8.

..... % **[4]**

**25** A sheet of A4 card weighs $1.19 \times 10^{-2}$ kg.

**(a)** Work out the weight of 500 sheets of the A4 card.

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

**(b)** Card is classified using *W*, the weight in grams per square metre (gsm).

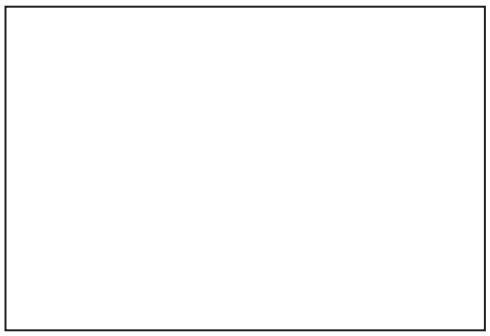
$$W = \frac{\text{weight in grams}}{\text{area in square metres}}$$

A sheet of A4 card is a rectangle that is 21 cm by 29.7 cm.

Calculate *W* for this A4 card.

**(b)** ..... gsm **[4]**

**26** The area of this rectangle can be written as $ax^2 + bx - 10$.




**Not to scale**

Find the values of $a$, $b$ and $c$.
You must show your working.

$a =$ ..... , $b =$ ..... and $c =$ ..... **[5]**

**END OF QUESTION PAPER**

## ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).