OCR
Oxford Cambridge and RSA

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# Monday 09 November 2020 – Morning

## GCSE (9–1) Mathematics

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

**Time allowed: 1 hour 30 minutes**

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

*8181848528*

*J560003*

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. You can use extra paper if you need to, but you must clearly show your candidate number, the centre number and the question numbers.
- 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 **20** pages.

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

Answer **all** the questions.

**1** 5 is a factor of 20.

**(a)** Write down another factor of 20.

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

**(b)** Write down a multiple of 20.

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

**2** **(a)** Complete the first seven square numbers.

1 4 9 16 ..... 36 49 **[1]**

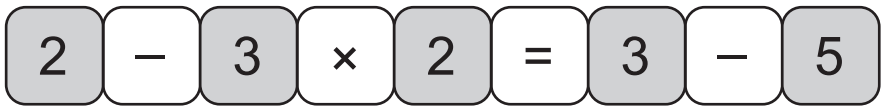
**(b)** Write the missing term in each sequence.

**(i)** 18 16 14 ..... 10 8 **[1]**

**(ii)** ..... 14 20 26 32 38 **[1]**

**3** Alex has a number game.
He must put down tiles to make two calculations with the same answer.

Here is what Alex put down.




Is he correct?
Show how you decide.

Alex is ..... because .....

.....

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

**4** A teacher asks nine of his pupils how many pets they have at home.

Here are the results.

1 1 1 2 3 4 5 7 111

**(a)** Work out the range of the nine results.

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

**(b)** The median of the nine results is 3.
The mean is 15.

**(i)** Write down the mode.

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

**(ii)** The teacher wants to use a sensible average to summarise the results.

Which average should he use and why?

..... because .....

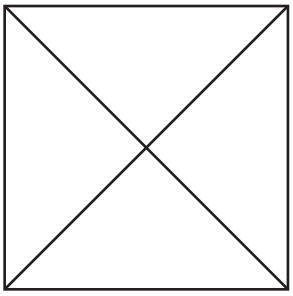
..... **[1]**

**5** **(a)** The curved surface of a solid is made from this flat shape.

Write down the mathematical name of the solid.

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

**(b)** This is the plan view of a different solid.



Write down the mathematical name of the solid.

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

**6** **(a)** Work out 70% of 50.

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

**(b)** Beth multiplies a number by 3 and divides the answer by 10.

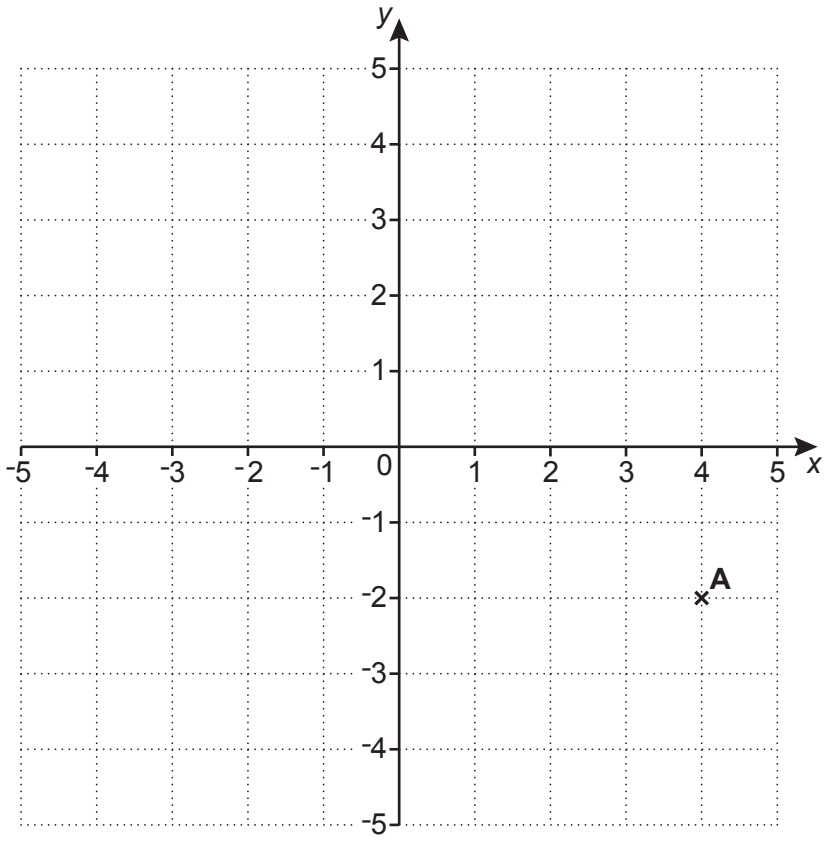
By what fraction has the number been reduced?

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

**(c)** Find a fraction which is bigger than $\frac{3}{7}$ and smaller than $\frac{4}{7}$.

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

**7** Point **A** is plotted at (4, -2) on this one-centimetre square grid.




Point **A** is a corner of a square with area 36 $cm^2$.
The other corners of the square have integer coordinates and lie on the grid.

Find the coordinates for the corner of the square that is diagonally opposite point **A**.
You may use the grid above to help you.

(..... , .....) **[3]**

**8** **(a)** Jo walks every day.
This week she walked an average of 2300 steps a day.
Next week she plans to increase this by 15%.

Work out how many steps she plans to walk **in total** next week?

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

**(b)** Jo buys a pair of walking boots for £63 in a sale.
She saves $\frac{1}{10}$ of the original price of the boots.

Work out how much money Jo saves.

**(b)** £..... **[3]**

**9** Mia has knitted 3 left-hand gloves: 1 blue, 1 green, and 1 red.
She has knitted 2 right-hand gloves: 1 green and 1 red.

She chooses a left-hand glove and a right-hand glove at random to make a pair of gloves.

Mia says

I have a probability of $\frac{2}{3}$ of choosing a pair of gloves of the same colour as there is a red pair and a green pair and there are three colours.

Is she correct?
Show how you decide.

Mia is ..... because .....

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

**10** Sundip is going on holiday.
She wants to change £400 into euros(€).

Bank A will change her £400 into €452.

Bank B changed £250 into €280 for Sundip's friend.
It will use the same rate to change Sundip's £400 into euros.

At which bank will Sundip receive the most euros and by how many?
Show your working.

At Bank ..... Sundip will receive € ..... more **[5]**

**11** $5(2x+1)+c(x+d)=12x-1$

Work out the value of $c$ and the value of $d$.

$c =$ .....

$d =$ ..... **[5]**

**12** **(a)** Complete the power of 2 for each statement by writing the missing value in the box.

**(i)** $2^3 \times 2^3 = 2^{\square}$ **[1]**

**(ii)** $\frac{1}{32} = 2^{\square}$ **[1]**

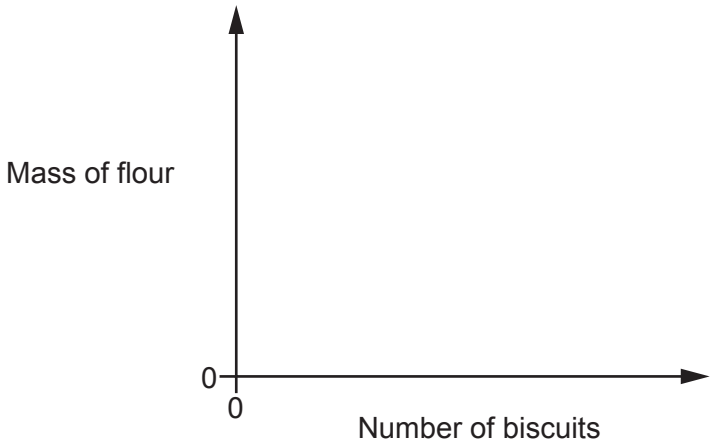
**(b)** $2 \times 2^y = 1$.

Find the value of $y$.

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

**13** **(a)** The mass of flour used in a recipe doubles as the number of biscuits made doubles.

On the axes below, sketch a graph to show this relationship.




**[2]**

**(b)** Here are some of the ingredients for a recipe to make 10 biscuits.

| To make 10 biscuits: | |
|---|---|
| 120 g | butter |
| 100 g | sugar |

Jane followed the recipe and used 432 g of butter.
All of the sugar used came from a new 2 kg bag.

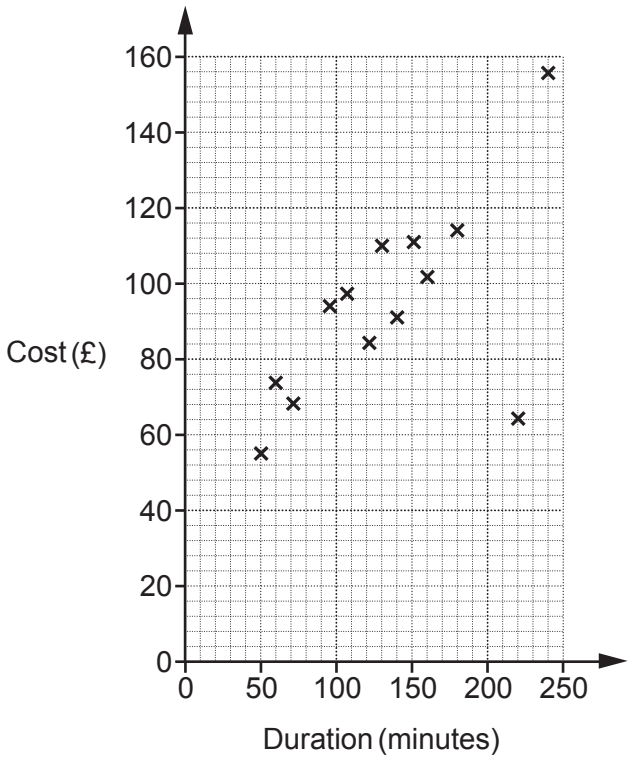
**(i)** Find the number of biscuits she made.

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

**(ii)** Find the mass of the sugar, in grams, that Jane has left in the bag.

**(ii)** ..... g **[3]**

**14** A travel agent records the duration and cost of the 15 flights he sold on one day.
The data for the first 13 flights are plotted on the scatter diagram.




**(a)** The data for the final two flights is:

| **Duration** | 210 minutes | 1 hour 40 minutes |
|---|---|---|
| **Cost** | £130 | £80 |

Plot these flights on the scatter diagram. **[2]**

**(b)** The cost of one of the 15 flights had been discounted in a sale.

Circle the most likely flight on the scatter diagram. **[1]**

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

**(ii)** Use your line of best fit to estimate the duration of a flight costing £90.

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

**(d)** Explain why the travel agent should not use his records to estimate the cost of a 7 hour flight.

.....

.....

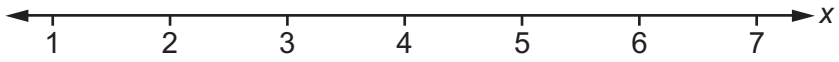
..... **[1]**

**15** A rectangle is three times as long as it is wide.
It has a perimeter of 44 cm.

Find the length of the rectangle.

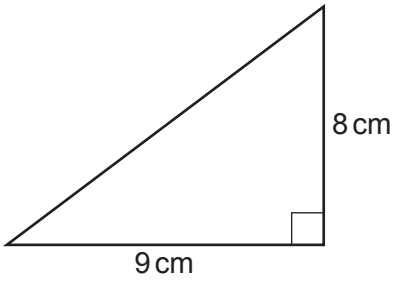
..... cm **[4]**

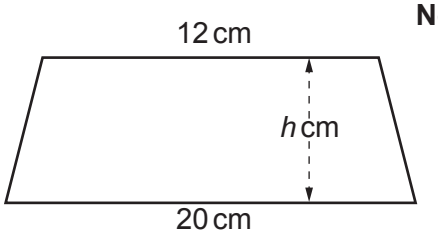
**16** Solve $3x + 4 < 19$.
Show your solution on the number line.




**[4]**

**17** The area of the triangle is equal to the area of the trapezium.



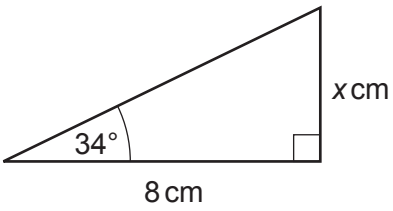




**Not to scale**

Calculate the height, $h$ cm, of the trapezium.

$h =$ ..... cm **[5]**

**18** Here is a right-angled triangle.




**Not to scale**

Use trigonometry to work out the value of $x$.

$x =$ ..... **[3]**

**19** **(a)** Work out the size of the exterior angle of a regular 12-sided polygon.

**(a)** .....° **[2]**

**(b)** Use your answer to part **(a)** to write down the size of the interior angle of a regular 12-sided polygon.

**(b)** .....° **[1]**

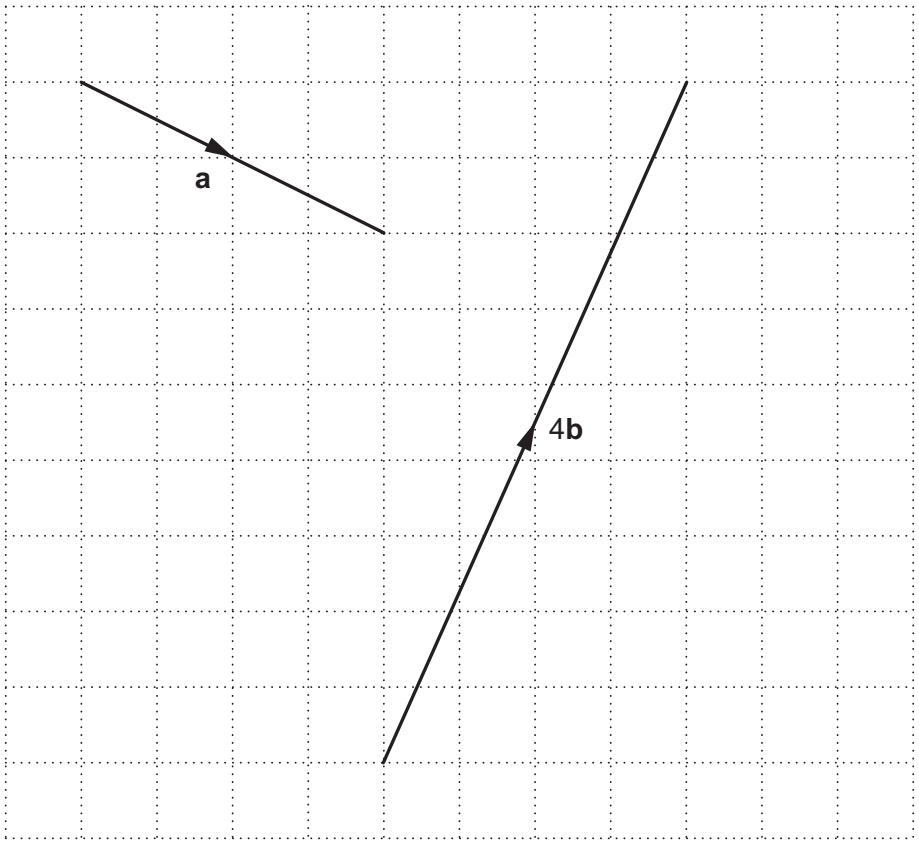
**20** A truck is used to transport some wood panels.
Each wood panel is a cuboid measuring 2.4 m by 1.2 m by 1.8 **cm**.
The density of each wood panel is 750 kg/$m^3$.

The truck can carry 15 tonnes of these wood panels.

Calculate the maximum number of wood panels that the truck can carry.
Show how you decide.

..... **[6]**

**21** Vectors **a** and 4**b** are drawn on the grid.




**(a)** Write vector **a** as a column vector.

**(a)** $\begin{pmatrix} \\ \end{pmatrix}$ **[2]**

**(b)** Find vector **b** as a column vector.

**(b)** $\begin{pmatrix} \\ \end{pmatrix}$ **[2]**

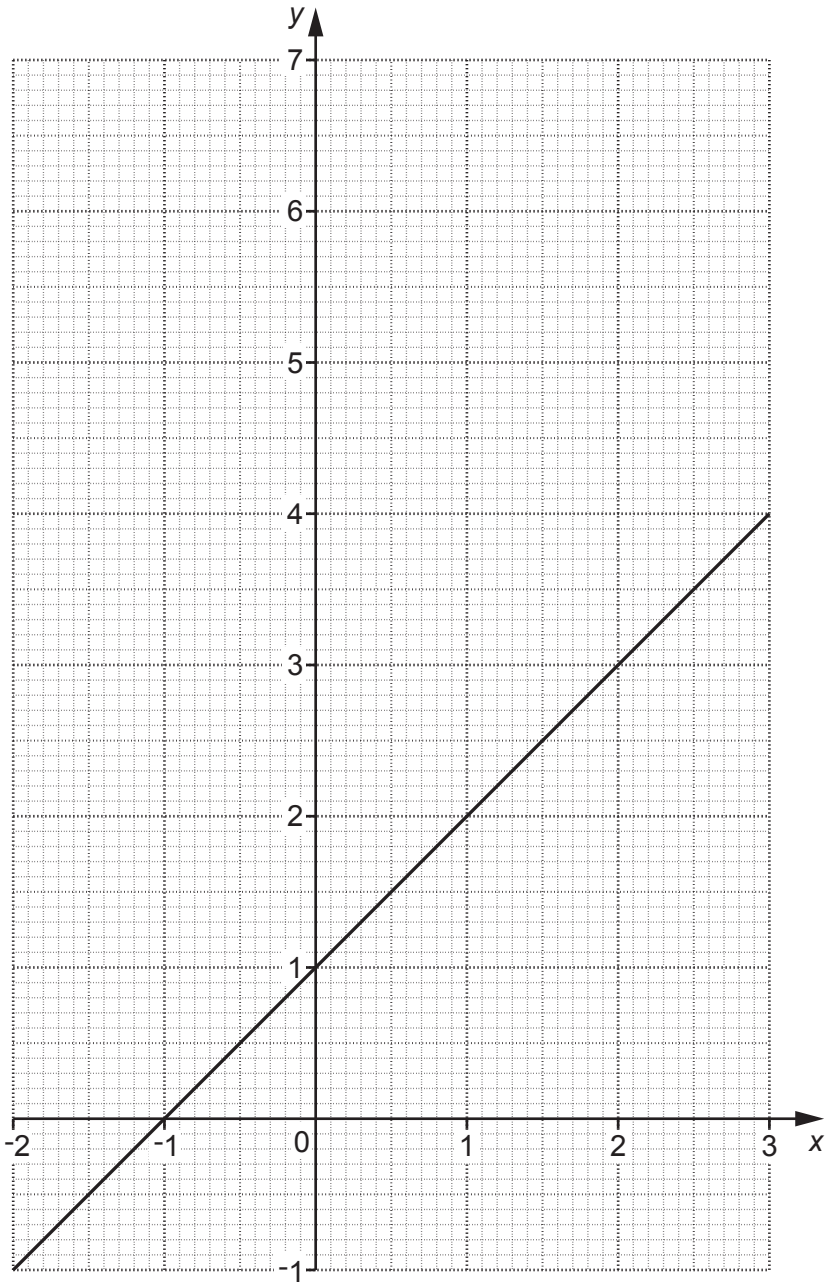
**22** **(a)** Complete this table for $y = x^2 - x$.

| $x$ | -2 | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| $y$ | 6 | | 0 | | 2 | 6 |

**[2]**

**(b)** The graph of $y = x + 1$ is shown on the grid.

On the same grid, use part **(a)** to draw the graph of $y = x^2 - x$ for values of x from -2 to 3.




**[3]**

**(c)** Write down the $x$-coordinates of the points where $y = x^2 - x$ and $y = x + 1$ cross.

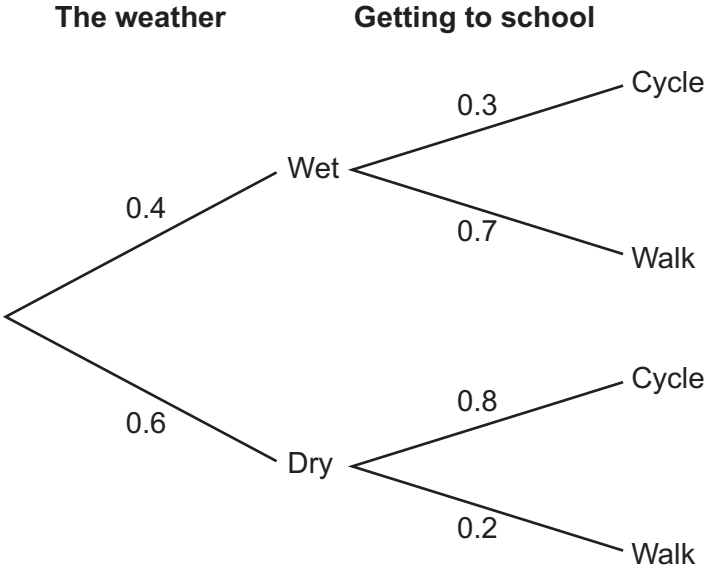
**(c)** $x =$ ..... and $x =$ ..... **[2]**

**Turn over for Question 23**

**23** The probability that Adam cycles to school or walks to school depends on the weather.

- On any day, the probability that the weather is wet is 0.4.
- When the weather is wet the probability that he cycles to school is 0.3.
- When the weather is dry the probability that he cycles to school is 0.8.

The information is shown on this tree diagram.




Work out the probability that

**(a)** it is dry and Adam walks to school,

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

**(b)** Adam cycles to school.

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

**END OF QUESTION PAPER**