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Worked Solutions

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

# GCSE MATHEMATICS

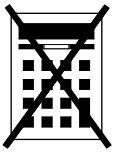
**F**

## Foundation Tier Paper 1 Non-Calculator

Wednesday 5 November 2025 Morning Time allowed: 1 hour 30 minutes

### Materials

For this paper you must have:
- mathematical instruments
- the Formulae Sheet (enclosed).



You must **not** use a calculator.

### 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.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

### Advice

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

| For Examiner's Use | |
|---|---|
| Pages | Mark |
| 2–3 | |
| 4–5 | |
| 6–7 | |
| 8–9 | |
| 10–11 | |
| 12–13 | |
| 14–15 | |
| 16–17 | |
| 18–19 | |
| 20–21 | |
| 22–23 | |
| 24 | |
| **TOTAL** | |

Please note that these worked solutions have neither been provided nor approved by AQA and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue should be written in the exam.

Anything written in green in a rectangle doesn't have to be written in the exam.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

Answer **all** questions in the spaces provided.

*Do not write outside the box*

**1 (a)** Work out 50% of 410

**[1 mark]**

2 0 5
2 | 4 1 ¹0

50% is equivalent to 1/2. Dividing the 410 by 2 finds that 1/2 of the 410 is 205

Answer 205

**1 (b)** Write 0.85 as a percentage.

**[1 mark]**

Multiplying any decimal by 100 converts it to a percentage. Moving the decimal point two places to the right multiplies it by 100

Answer 85 %

**1 (c)** Write down **one** number between 10 and 20 that is a factor of 24

**[1 mark]**

Answer 12

1, 24
2, 12

Listing the factors of 24 in pairs until one is found which is between 10 and 20. Factors of 24 are numbers which 24 is divisible by



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**2 (a)** Simplify $c \times d$

**[1 mark]**

Writing the letters next to each other means that they are multiplied

Answer cd

**2 (b)** Simplify fully $a + a$

**[1 mark]**

a + a = 2 × a = 2a

Answer 2a

**2 (c)** Simplify fully $3m + 2m - 6m$

**[1 mark]**

Collecting like terms. 3 + 2 - 6 = -1 so 3m + 2m - 6m = -1m = -m

Answer -m

**Turn over for the next question**

6

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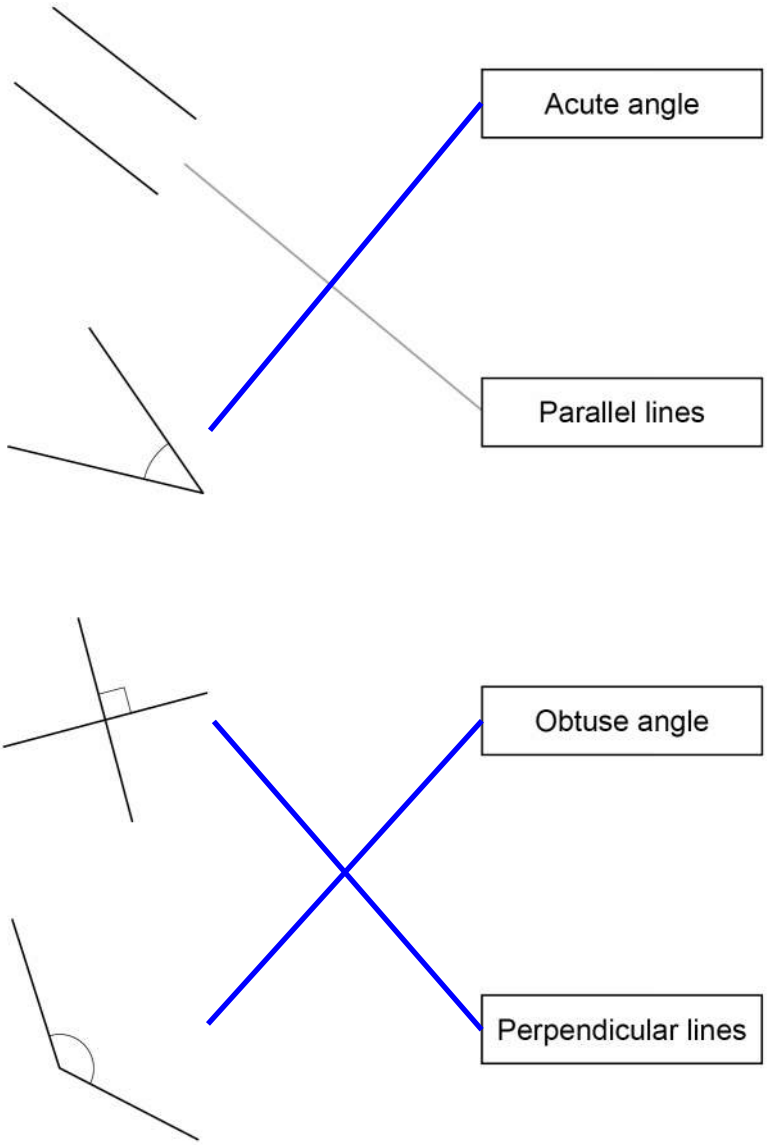
**3** Match each diagram to its description.

One has been done for you.

**[2 marks]**




Acute angle is an angle which is less than a right-angle (90°).

Perpendicular means that they meet at right-angles to each other.

Obtuse angle is an angle which is more than a right-angle (90°) and less than a straight line (180°)



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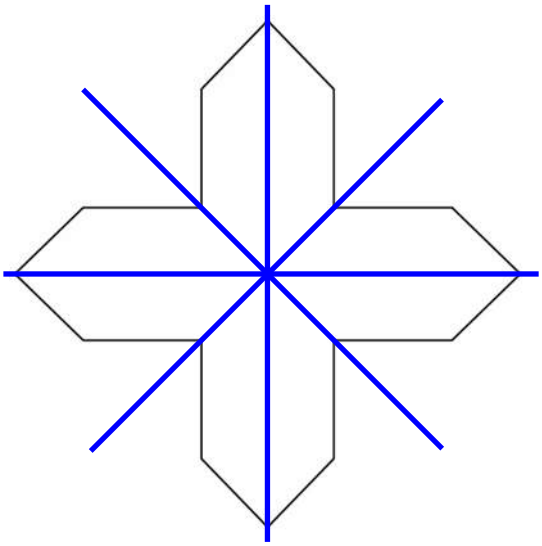
**4 (a)** Draw the **four** lines of symmetry on the shape below.

**[2 marks]**



Lines of symmetry are straight lines which cut the shape into two equal halves which are a refection of each other

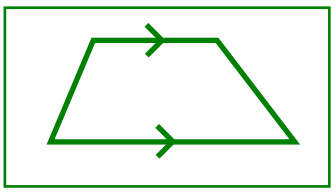
**4 (b)** A different shape has

- 4 sides
- exactly **one** pair of parallel sides.

Write down the name of the shape.

**[1 mark]**

Answer Trapezium



**Turn over for the next question**

5

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**5 (a)** Change 240 minutes to hours.

**[1 mark]**

240 ÷ 60 ← There are 60 minutes in 1 hour. So dividing the 240 minutes by 60 converts it to hours

24 ÷ 6 ← Dividing both the 240 and 60 by 10 gives an equivalent division

Answer 4 hours

**5 (b)** 1 inch = 2.5 centimetres

Change 20 inches to centimetres.

**[2 marks]**

$$\begin{array}{r} 2.5 \\ \times\ 20 \\ \hline 50.0 \\ {\scriptstyle 1} \end{array}$$

← Multiplying the 2.5 centimetres by 20 converts the 20 inches to centimetres

Answer 50 cm



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**6** Alice and Ben each have some sweets.

Chris has no sweets.

- Alice gives 6 sweets to Chris.
- Ben gives 9 sweets to Chris.

Now they all have the same number of sweets.

How many sweets did **Ben** have to start with?

**[2 marks]**

6 + 9 ← Adding the 6 sweets which Alice gives to Chris and the 9 sweets which Ben gives to Chris finds that Chris now has 15 sweets. As they now all have the same number of sweets, they all now have 15 sweets

15 + 9 ← Adding the 9 sweets which Ben gave away to the 15 sweets that Ben has at the end finds that Ben had 24 sweets to start with

Answer 24

**Turn over for the next question**

5

*Do not write outside the box*

**7 (a)** Four numbers have a range of 10

Three of the numbers are 11, 15 and 18

Work out the **two** possible values of the other number.

**[2 marks]**

Range is the difference between the smallest and largest number

18 - 10 ← If the largest number is 18, the smallest must be 10 less than this so could be 8

11 + 10 ← If the smallest number is 11, the largest must be 10 greater than this so could be 21

Answer 8 and 21

**7 (b)** Here are five numbers.

8 7 3 8 4

Abi says the median is 3

Is he correct?

Tick a box.

Yes ☐ No ☑

Give a reason for your answer.

**[1 mark]**

3, 4, 7, 7, 8

The median is 7

The median is the middle number when they are put in order

**7 (c)** This is Emmy's method to work out the mean of 9, 12 and 18

$9 + 12 + 18 \div 3 = 27$

What is wrong with her method?

**[1 mark]**

Only divided the 18 by 3

The mean is the total of all the numbers divided by how many numbers there are



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**8** Jay is buying eggs to make omelettes.

They will

- make 7 omelettes
- use 3 eggs for each omelette.

They buy 2 boxes of eggs.

There are 15 eggs in each box.

How many eggs does Jay have left after making all 7 omelettes?

**[3 marks]**

15
× 2
30
1

← Multiplying the 15 eggs in each box by the 2 boxes finds that there are 30 eggs in total

3 × 7 ← Multiplying the 3 eggs for each omelette by the 7 omelettes finds that Jay uses 21 eggs

2 1
3 0
- 2 1
0 9

← Subtracting the 21 eggs used from the 30 eggs bought finds that there are 9 eggs left

Answer 9

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

18 16 30 29 49 8

Work out the **difference** between the two **square** numbers.

**[3 marks]**

4 9
- 1 6
3 3

← $4^2 = 4 \times 4 = 16$ and $7^2 = 7 \times 7 = 49$. So 16 and 49 are the two square numbers. Subtracting these from each other finds that the difference is 33

Answer 33

10

**Turn over ►**



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**10** Ethan and Sal bought some items.

Ethan

- paid with two £20 notes
- was given a £5 note, two £2 coins and a 50p coin as change.

Sal bought

- a bag for £13.49
- a necklace for £17.29

Who spent more, Ethan or Sal?

You **must** show your working.

**[5 marks]**

$20 + 20 = 40$ ← Adding the two £20 notes finds that Ethan paid £40

$5 + 2 + 2 + 0.50$ ← Adding the £5 note, the two £2 coins and the 50p (which is £0.50) finds that Ethan got £9.50 change

$$\begin{array}{r} {}^{3}\cancel{4}{}^{1}{}^{9}\cancel{0}{}^{1}.0\,0 \\ -\ \ 9.5\,0 \\ \hline 3\,0.5\,0 \end{array}$$

← Subtracting the £9.50 change from the £40 paid finds that Ethan spent £30.50

$$\begin{array}{r} 13.49 \\ +\ 17.29 \\ \hline 30.78 \\ {\scriptstyle 1\quad 1} \end{array}$$

← Adding the £13.49 and the £17.29 finds that Sal spent £30.78

Answer Sal

↑ The £30.78 Sal spent is more than the £30.50 Ethan spent



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**11** Masood rides his bike every day for 42 days.

Each day he rides 13 miles.

Work out the **total** number of miles he rides.

**[3 marks]**

42
×13
126
420
546

Multiplying the 13 miles each day by the 42 days finds that the total number of miles is 546

Answer 546 miles

**12** Here are two calculations.

| A | B |
|---|---|
| 2 × 3 + 14 | 12 + 54 ÷ 3 |

Work out answer to A × answer to B

**[3 marks]**

6 + 14 = 20 ← 2 × 3 = 6 then adding the 14 gives 20, which is the answer to A

18
3 | 5 ²4 ← Finding that 54 ÷ 3 = 18. The order of operations (BIDMAS) must be followed so the division is done before the addition

12 + 18 = 30 ← So the answer to B is 30

20 × 30 ← answer to A × answer to B

2 × 3 = 6 so 20 × 30 = 600

Answer 600

11



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**13 (a)** A bag has only green discs and pink discs in the ratio 7 : 5

What fraction of the discs are green?

**[1 mark]**

7 + 5 ← Adding the 7 parts and the 5 parts finds that there are 12 parts in total in the ratio

Answer $\frac{7}{12}$

7 out of the 12 parts are for green

**13 (b)** Another bag has blue discs and orange discs in the ratio 2 : 1

There are 40 blue discs.

How many orange discs are in the bag?

**[1 mark]**

40 ÷ 2 ← 2 parts of the ratio represent the blue discs. So dividing the 40 blue discs by 2 finds that 1 part of the ratio is worth 20 discs, which is also the number of orange discs

Answer 20

**13 (c)** In a different bag there are 72 red discs and 54 yellow discs.

Write the ratio red discs : yellow discs in its simplest form.

**[2 marks]**

$2\overline{)72}$ $2\overline{)54}$ ← The ratio is 72 : 54. Dividing both sides by 2 simplifies it to 36 : 27

$3\overline{)36}$ $3\overline{)27}$ ← Dividing both sides by 3 simplifies it to 12 : 9

Answer 4 : 3

Dividing both sides by 3 simplifies it to 4 : 3. It cannot go any simpler as 4 and 3 cannot be divided by the same amount to get smaller whole numbers



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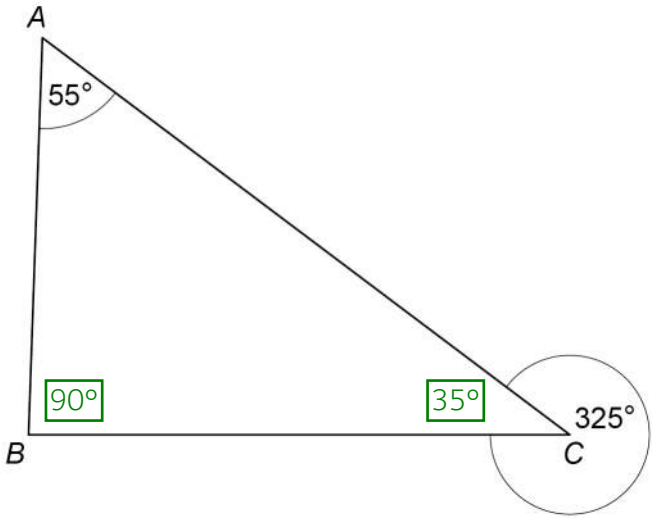
**14** Here is triangle *ABC*.




Not drawn accurately

Show that *ABC* is a right-angled triangle.

**[2 marks]**

$$\begin{array}{r} 3\,\overset{5}{6}\overset{1}{\cancel{0}} \\ -\,3\,2\,5 \\ \hline 3\,5 \end{array}$$

There are 360° in total around a point. So subtracting the 325° from 360° finds that angle ACB = 35°

$$\begin{array}{r} 55 \\ +\,35 \\ \hline 90 \\ {\scriptstyle 1} \end{array}$$

Adding the 55° and the 35° finds that there are 90° so far in the triangle

$$\begin{array}{r} {\scriptstyle 0}\overset{\cancel{1}}{1}\overset{1}{8}0 \\ -\,9\,0 \\ \hline 0\,9\,0 \end{array}$$

There are 180° in a triangle. So subtracting the 90° so far from 180° shows that angle ABC = 90°, which is a right-angle so ABC is a right-angled triangle

**Turn over for the next question**

6

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**15** The number of people visiting a museum for 6 months is shown in the table.

| Month | Number of people |
|---|---|
| April | 2075 |
| May | 2292 |
| June | 362 |
| July | 2217 |
| August | 2022 |
| September | 837 |

**15 (a)** The museum usually opens every day.
The museum had to close for 3 weeks in one of the six months.

In which of the six months do you think this is most likely to have happened?
Give a reason for your answer.

**[1 mark]**

Month June

Reason It had the lowest number

**15 (b)** Each person paid £19.75 for a ticket.

By **rounding**, estimate the income from ticket sales for **May**.

**[2 marks]**

2000 × 20 ← The 2292 people can be rounded to 2000 people. The £19.75 can be rounded to £20. Multiplying the 2000 people by the £20 estimates the income

2 × 2 = 4 so 2000 × 20 = 40000

Answer £ 40000



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**16**

Box A



Each button 10 g

Box B



Each button 15 g

The total mass of buttons in box A is

- between 70 g and 100 g
- equal to the total mass of buttons in box B.

Work out the number of buttons in each box.

**[2 marks]**

15, 30, 45, 60, 75, 90

The total mass of the buttons in box A must be a multiple of 10. The total mass of the buttons in box B must be a multiple of 15. So listing out the 15 times table until a multiple of 10 is found which is between 70 and 100

Box A has 9 buttons

Box B has 6 buttons

The mass of the buttons in box A must be 90g (which is 9 lots of 10g) and the mass of the buttons in box B must be 90g (which is 6 lots of 15g)

5



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**17** The possible values of $x$ are 12 or 30

The possible values of $y$ are 2 or 3

**17 (a)** Work out the **four** possible values of $\frac{x}{y}$

**[2 marks]**

Systematically going through the possibilities

12/2 → 6 | 12/3 → 4 | 30/2 → 15 | 30/3 → 10

Answer 6 4 15 10

**17 (b)** Work out the **greatest** possible value of $4x + 5y$

**[2 marks]**

4(30) + 5(3) ← x and y should be as great as possible. Substituting 30 for x and 3 for y

120 + 15 ← 4(30) = 120 and 5(3) = 15

Answer 135



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**18** Two coins are spun.

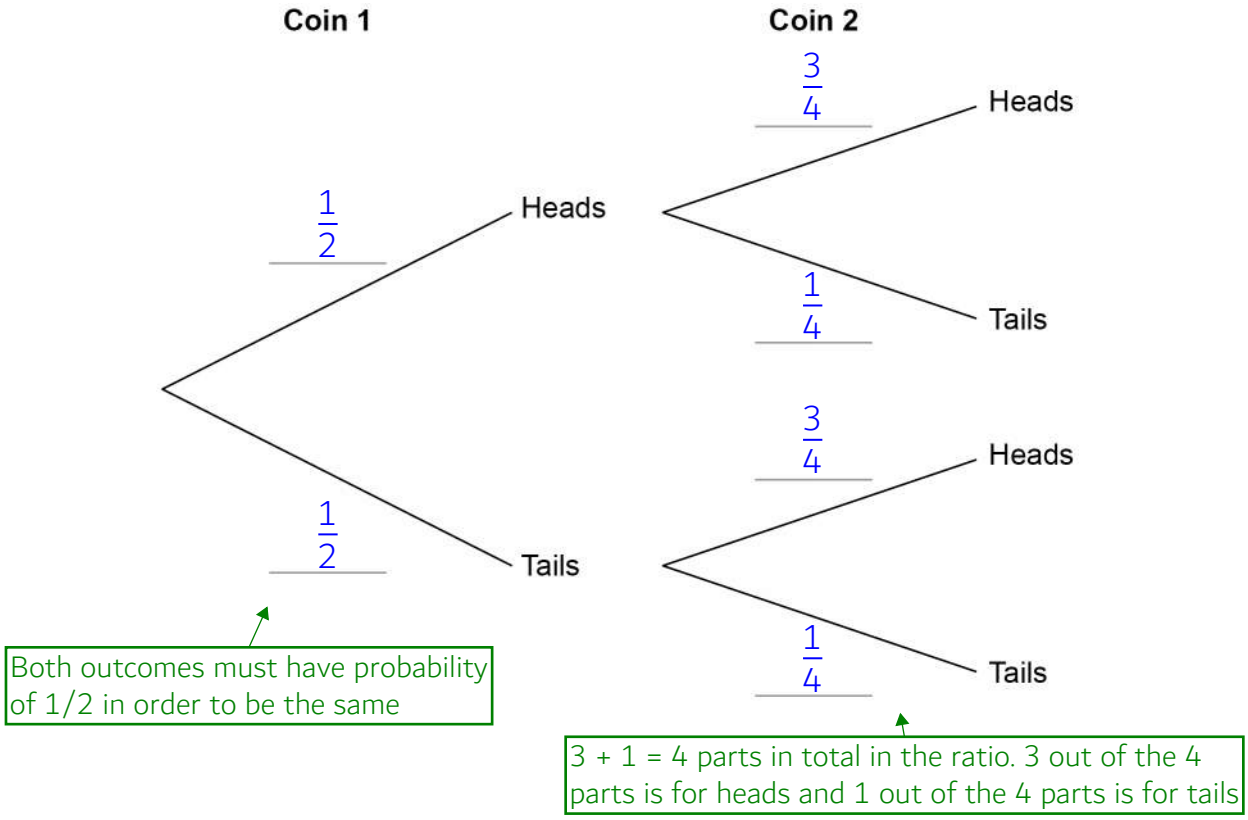
Coin 1 is fair.

Coin 2 is **three** times as likely to land on heads as tails. 3 : 1

Writing the ratio of heads to tails for Coin 2

**18 (a)** Complete the tree diagram.

**[2 marks]**




Both outcomes must have probability of 1/2 in order to be the same

3 + 1 = 4 parts in total in the ratio. 3 out of the 4 parts is for heads and 1 out of the 4 parts is for tails

**18 (b)** Work out the probability that **both** coins land on heads.

**[2 marks]**

$\frac{1}{2} \times \frac{3}{4}$ ← Heads AND heads. AND means to multiply the probabilities

Answer $\frac{3}{8}$

8

Turn over ►



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**19** Solve $7x - 2 = 3x + 16$

**[3 marks]**

$4x - 2 = 16$ ← Subtracting 3x from both sides to get all the x on the same side

$4x = 18$ ← Adding 2 to both sides to eliminate the -2 on the left and get the x term on its own

$x = \frac{18}{4}$

↑ Dividing both sides by 4 gets x on its own. 18 cannot be divided by 4 to get a whole number so it can be left as a fraction which does not need to be simplified



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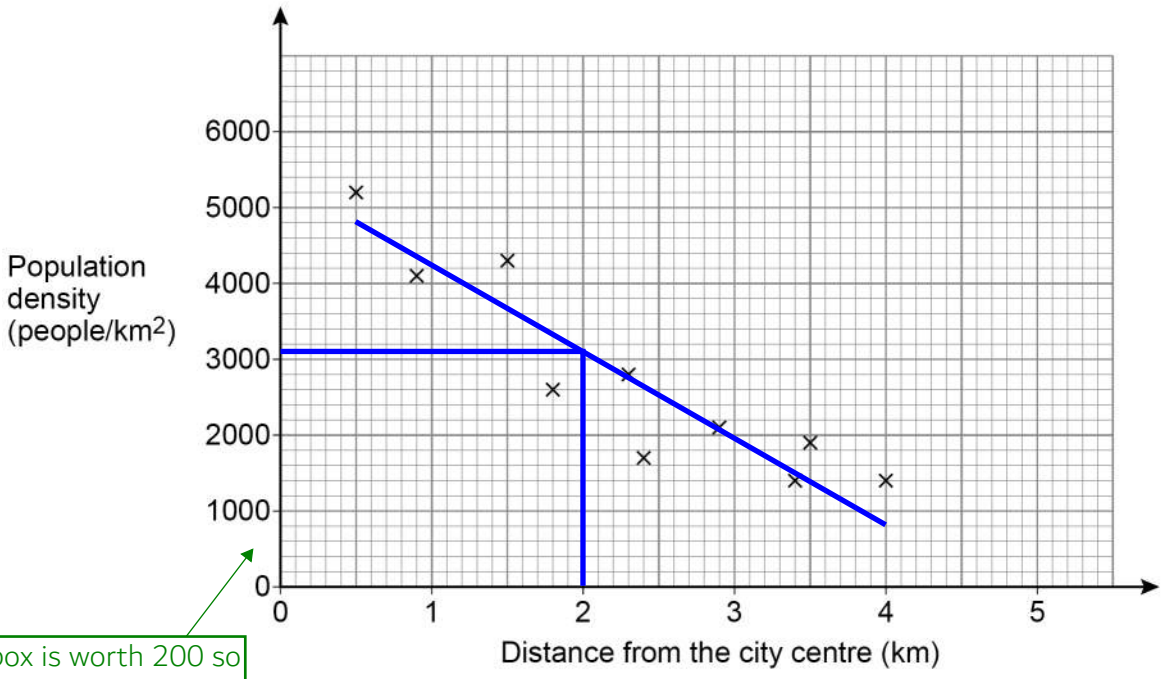
**20** The scatter graph shows the population density of ten areas in a city and the distance of the area from the city centre.




Each box is worth 200 so half a box is worth 100

**20 (a)** The scatter graph shows negative correlation.

Describe the relationship between the population density and the distance of the area from the city centre.

**[1 mark]**

As the distance from the city centre increases, the population density decreases

**20 (b)** Use a straight **line of best fit** to estimate the population density of an area 2 km from the city centre.

**[2 marks]**

Answer 3100 people/km²

Drawing a line of best fit using a clear ruler and lining it up so that it goes in the same direction as the points and there is roughly an even spread of points above and below the line. Reading up from 2 km to the line then across to the population density

6

Do not write outside the box

**21 (a)** Work out $\frac{2}{5} + \frac{7}{20}$

Give your answer as a **decimal**.

**[2 marks]**

$\frac{8}{20} + \frac{7}{20}$ ← Multiplying both the numerator and denominator of the 1st fraction by 4 so that the denominator of both fractions are the same

$\frac{15}{20} = \frac{3}{4}$ ← The fractions can be added by adding the numerators and keeping the denominator the same. Simplifying by dividing both the numerator and denominator by 5

$$\begin{array}{r} 0.\ 7\ 5 \\ 4\,\overline{)\,3.\,{}^{3}0\ {}^{2}0} \end{array}$$ ← Dividing the numerator by the denominator converts the fraction to a decimal

Answer 0.75

**21 (b)** $x$ is an integer and $\frac{1}{x}$ converts to a **terminating** decimal.

Has no recurring digits

Kelly says,

"There must be only **one** digit after the decimal point, because $\frac{1}{2} = 0.5$"

Is she correct?

Tick a box.

Yes ☐ No ☑

Give a reason for your answer.

**[1 mark]**

$\frac{1}{4} = 0.25$ ← x could be 4 as 1/4 = 0.25 which has two digits after the decimal point



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**22 (a)** Complete the table of values for $x + 2y = 3$

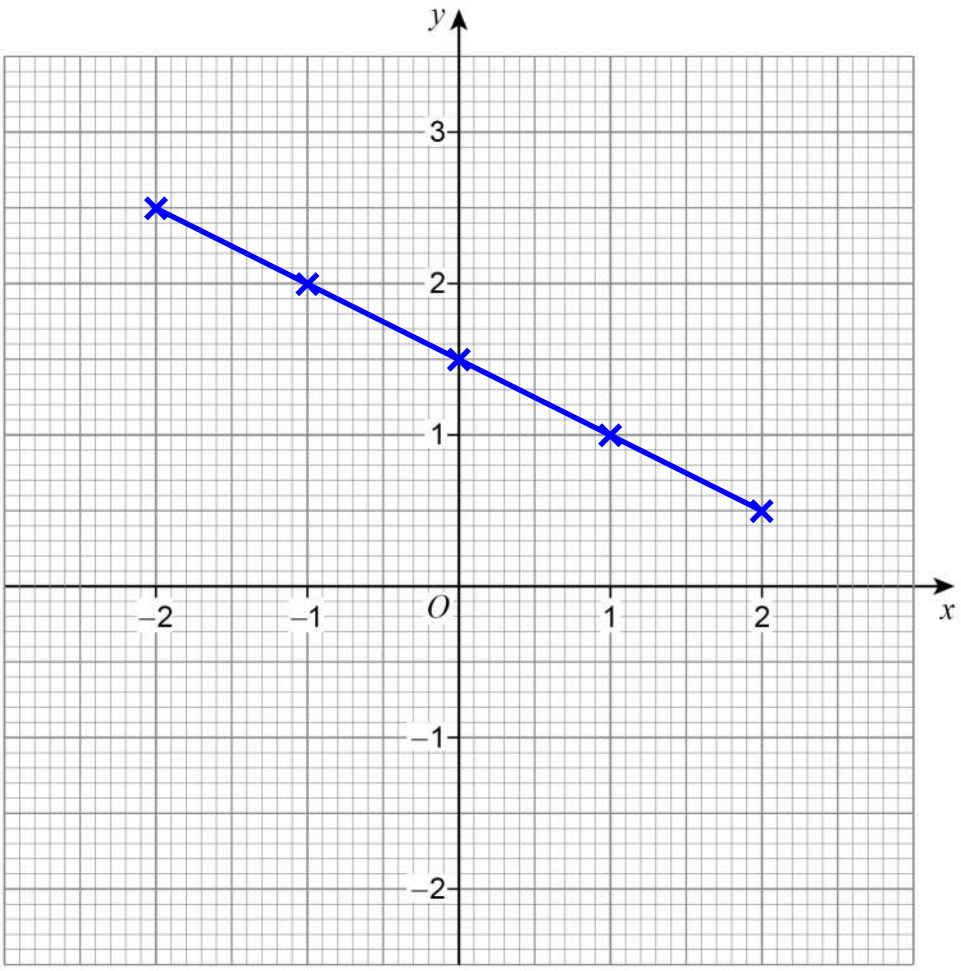
**[2 marks]**

| $x$ | –2 | –1 | 0 | 1 | 2 |
|---|---|---|---|---|---|
| $y$ | 2.5 | 2 | 1.5 | 1 | 0.5 |

It is a straight line graph as there are no powers of x or y and does not have x or y as denominators. So it must change by the same amount between each value of y. It is going down in 0.5s

**22 (b)** Draw the graph of $x + 2y = 3$ for values of $x$ from –2 to 2

**[2 marks]**




Plotting the points from the table of values then connecting them with a straight line

7

**Turn over ►**



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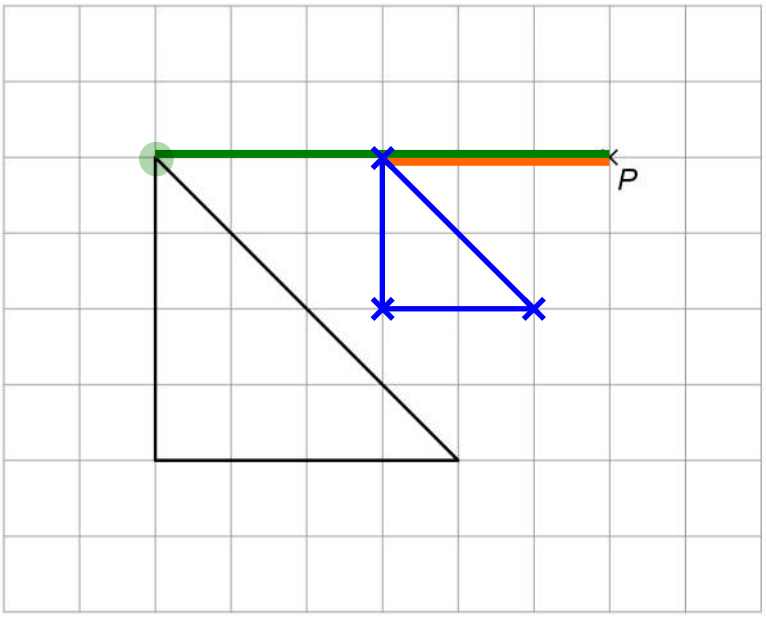
**23** On the grid, draw an enlargement of the triangle with

- scale factor $\frac{1}{2}$
- centre of enlargement $P$

**[3 marks]**




The corner highlighted in green is 6 to the left of P. Halving this distance (as the scale factor is 1/2) gives 3 to the left. So the corner must become 3 to the left of P. Then the other corners can be worked out by halving the lengths of the original triangle. Joining up the corners gives the new triangle



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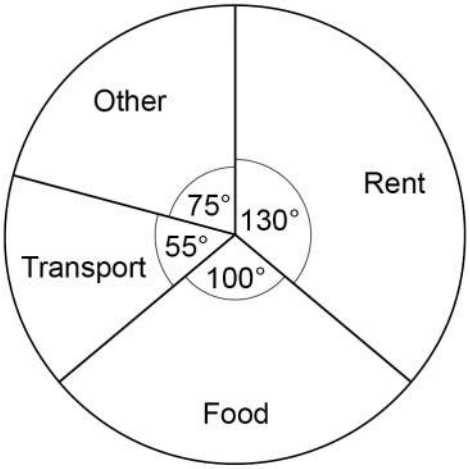
**24** The pie chart below shows what Jane spent her money on last month.

Not drawn accurately




**24 (a)** Write the ratio Transport : Other : Food in its simplest form.

**[2 marks]**

55 : 75 : 100 ← Writing a ratio using the angles

Simplifying by dividing all sides by 5. It cannot go simpler as 11, 15 and 20 cannot all be divided by the same amount to get smaller whole numbers

Answer 11 : 15 : 20

**24 (b)** Jane spent £390 on rent.

Work out how much she spent on transport.

**[3 marks]**

$$\begin{array}{r} 0\ 0\ 3 \\ 130\,\overline{)\,3\ {}^{3}9^{39}0} \end{array}$$

← Dividing the £390 by the 130° which represent it finds that 1° is worth £3

130, 260, 390 ← Listing the 130 times table to help with the division

$$\begin{array}{r} 55 \\ \times\ 3 \\ \hline 1\,65 \end{array}$$

← Multiplying the 55° for transport by the £3 which each degree represents finds that £165 was spent on transport

Answer £ 165

8

Turn over ►



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**25** A sector has perimeter $6\pi + 24$ cm

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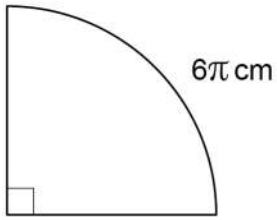


Work out the area of the sector.

Give your answer in terms of $\pi$

**[3 marks]**

$24 \div 2$ ← Subtracting the 6π cm from the perimeter leaves 24 cm for the other two lengths, which are both radii. As all radii of the same circle or sector are the same length, dividing this 24 cm by 2 finds that one of them is 12 cm, which is the radius

$\pi \times 12^2$ ← Area of circle = π × radius$^2$. So the area of the full circle would be 144π cm$^2$

$4\overline{)144}$ = 36 ← The sector is 1/4 of the full circle so dividing the area of the full circle by 4 gives the area of the sector

Answer $36\pi$ cm$^2$

**END OF QUESTIONS**

3



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