

Wednesday 11 June 2025 – 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

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

Centre number

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Candidate number

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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 page 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 π button on your calculator or take π 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.

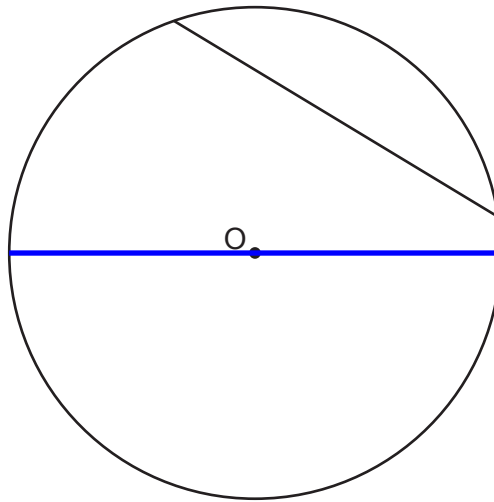
Please note that these worked solutions have neither been provided nor approved by OCR and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

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

- 1 The diagram shows a circle, centre O, and a straight line.



- (a) Write down the mathematical name for

- (i) the straight line

A straight line connecting two points on the outside of the circle

(a)(i) Chord [1]

- (ii) the perimeter of the circle.

The outside of the circle

(ii) Circumference [1]

- (b) On the diagram, draw a diameter.

A straight line connecting two points on the outside of the circle which goes through the centre

[1]

- 2 (a) (i) Round 4352 to the **nearest hundred**.

The 3 is in the hundreds place. The 5 after it causes the 3 to round up to a 4. Then everything after the hundreds is ignored and set to 0

..... 4400 [1]

- (ii) Round £5.3725 to the **nearest penny**.

(ii) £ 5.37 [1]

- (b) A decorator works out how much to charge for some painting.

The decorator

- rounds **up** the area to be painted to the next 10 m^2
- then charges £65 for every 10 m^2 .

Work out how much the decorator charges for painting an area of 74 m^2 .

$80 \div 10$ ←

Rounding 74 m^2 up to the next 10 m^2 gives 80 m^2 .
Dividing this by 10 finds that 80 m^2 is 8 lots of 10 m^2

8×65 ←

It is 8 lots of 10 m^2 so will be 8 lots of £65

(b) £ 520 [2]

- 3 (a) Write $5 \times 5 \times 5 \times 5 \times 5$ as a power of 5.

There are 6 5s multiplied together

(a) 5^6 [1]

- (b) Write down the value of 1^{10} .

Typing it into the calculator

(b) 1 [1]

- (c) Work out.

$$4 \times 4 \times 4 - 3^3$$

Typing it into the calculator

(c) 37 [2]

- 4 (a) Write 1% as a decimal.

$1 \div 100$ ← Dividing any percentage by 100 converts it to a decimal

(a) 0.01 [1]

- (b) Write 35% as a fraction.
Give your answer in its simplest form.

$\frac{35}{100}$ ← Putting any percentage over 100 converts it to a fraction

Putting it into the calculator simplifies the fraction

(b) $\frac{7}{20}$ [2]

- (c) Work out 15% of 2 litres.
Give your answer in millilitres.

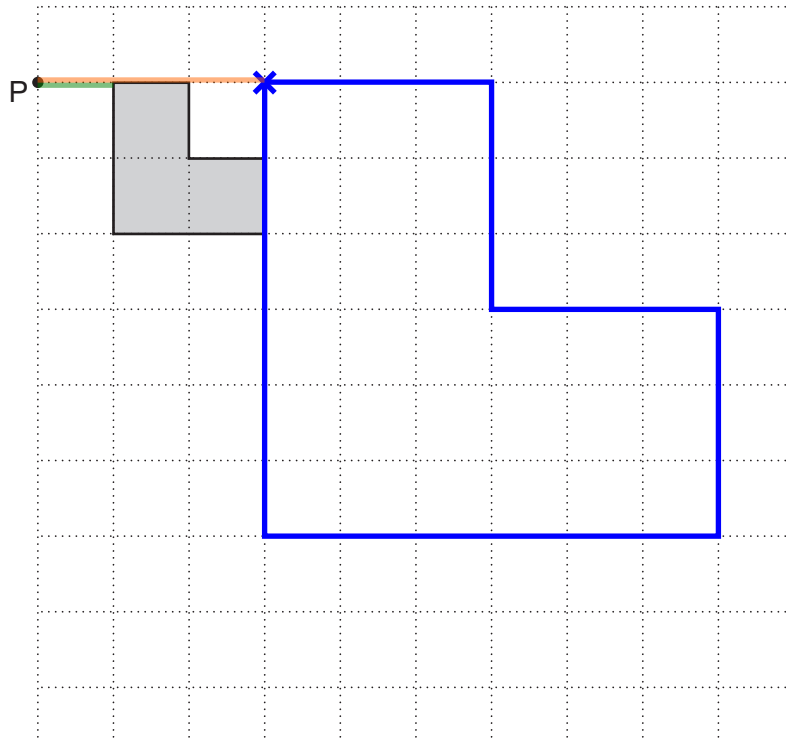
2×1000 ← 1 litre = 1000 millilitres. So multiplying the 2 litres by 1000 converts it to 2000 millilitres

$\frac{15}{100} \times 2000$ ← Putting the 15% over 100 converts the 15% to a fraction. Multiplying this by the 2000 millilitres finds that 15% of 2000 millilitres is 300 millilitres

(c) 300 ml [3]

Turn over

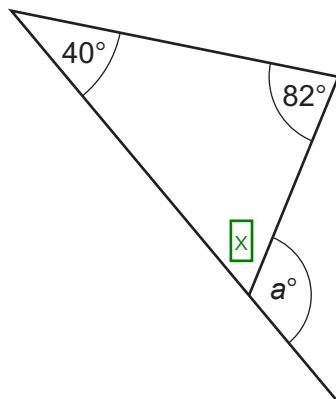
- 5 Enlarge the shaded shape with scale factor 3 and centre of enlargement at point P.



It was 1 to the right from the centre P to the closest corner. Multiplying this by the scale factor of 3 finds that the closest corner will now be 3 to the right from the centre P. Marking this point then drawing the same shape with all the sides multiplied by 3

[2]

- 6 (a) The diagram shows a triangle with one side extended.



Not to scale

Work out the value of a .

$180 - 40 - 82$ ← There are 180° in a triangle. So subtracting the other angles in the triangle from 180° finds that the angle x is 58°

$180 - 58$ ← Angles around a point on a straight line add up to 180° . So subtracting the angle x from 180° finds that a is 122

122

[2]

- (b) Complete the statement below using the correct symbol and value from this list.

< 90° = 90° > 90° < 180° = 180° > 180°

When the two smallest angles in a triangle are added the answer is always < 180° [1]

There are 180° in total in a triangle. Subtracting the largest angle from 180° leaves the other two angles added together, which must be less than 180°

- 7 A shop assistant works for 7 hours each day for 5 days.
The shop assistant is paid the same amount for each hour they work.
In the 5 days, the shop assistant earns £448.

How much does the shop assistant earn per hour?

7×5

Multiplying the 7 hours each day by the 5 days finds that the shop assistant works for 35 hours over the 5 days

$448 \div 35$

Dividing the £448 by the 35 hours worked finds that £12.80 is earned per hour

£ 12.80 [3]

- 8 (a) A student thinks of a number.
The student takes 16 from the number and then divides by 4.
The answer is 8.

What number is the student thinking of?

8×4

$32 + 16$

Doing the opposite operations in the opposite order takes it back from the answer to the original number. Multiplying by 4 is the opposite of dividing by 4 then adding 16 is the opposite of taking away 16

(a) 48 [2]

- (b) A teacher thinks of a number.
150% of the number is 36.

What number is the teacher thinking of?

$36 \div 150$

Dividing the 36 by 150 finds that 1% of the original number is 0.24

0.24×100

Multiplying the value of 1% of the original number by 100 finds that 100% of the original number is 24

(b) 24 [2]

- 9 Sam sees a computer tablet for sale on the internet for 126 euros (€).
Sam has £105 to spend.

The exchange rate is £1 = €1.15.

Can Sam buy the tablet?
Show how you decide.

$$105 \times 1.15 = 120.75$$

Multiplying the £105 by the €1.15 each £1 is worth finds that the £105 is worth €120.75

No

The €120.75 Sam has is less than the €126 cost of the tablet

..... because

..... [2]

10 (a) This is a function machine.



(i) Find the output when the input is 10.

$10 + 5$ ← Doing the 1st step of the function machine to the input gives 15

$15 \div 2$ ← Doing the 2nd step of the function machine to the 15 gives 7.5

(a)(i) 7.5 [1]

(ii) Find the input when the output is 24.

24×2
 $48 - 5$ ← Doing the opposite operations in the opposite order takes it back from the output to the input. The opposite of dividing by 2 is multiplying by 2 then the opposite of adding 5 is subtracting 5

(ii) 43 [2]

(b) This is a different function machine.



a and b are both positive integers.
 When a is 7 the value of b is 26.

Find another pair of values for a and b .

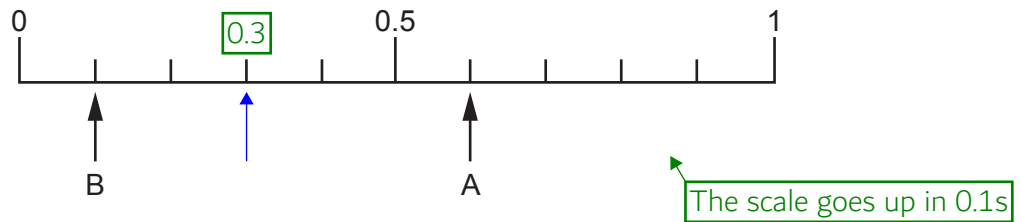
Keep subtracting one more from 8 until a positive integer is found which can be multiplied by a positive integer to get 26. 7, 6, 5, 4, 3, 2... 2 can be multiplied by 13 to get 26. 6 must be subtracted from 8 to get this 2. So $8 - 6 = 2$ then $2 \times 13 = 26$. a was 6 and b was 13

(b) $a =$ 6
 $b =$ 13 [3]

Turn over

- 11 A student has a three-sided spinner with sides labelled A, B and C. They spin the spinner a number of times and record the results.

The student works out the correct relative frequencies for the spinner landing on sides A and B. The relative frequencies are shown on this scale.



- (a) Write down the relative frequency that the spinner landed on side A.

(a) 0.6 [1]

- (b) (i) The student then works out the relative frequency that the spinner landed on side C is 0.4.

Explain, using a calculation, why the relative frequencies show that the student has made a mistake.

0.6 + 0.1 ← Adding the 0.6 for A and the 0.1 for B finds that the relative frequency known so far is 0.7

1 - 0.7 ← Subtracting the relative frequency known so far from 1 (as relative frequency is out of 1) finds that the relative frequency for C must be 0.3

The relative frequency of C is 0.3

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

- (ii) On the scale above, mark with an arrow (↑) the **correct** relative frequency that the spinner landed on side C. [1]

- (c) The student says

The **probability** that the spinner will land on side B on my next spin is 0.1.

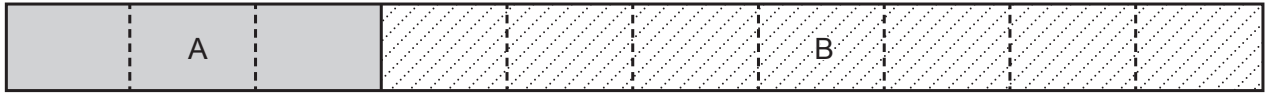
What assumption is the student making?

The calculated relative frequency is the probability

The relative frequency the student calculates can only be an estimate of the actual probability. It may not be completely accurate. Spinning it more times gives a more reliable estimate which is more likely to be accurate

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

- 12 The diagram shows a large rectangle made from 10 smaller rectangles of equal area. The large rectangle is divided into two unequal parts, A and B.



- (a) Tick (✓) all the correct statements.

$A : B = 3 : 10$	
$A : B = 3 : 7$	✓
A is $\frac{3}{10}$ of the large rectangle	✓
A is $\frac{3}{7}$ of the large rectangle	

← A is 3 parts and B is 7 parts

← A is 3 out of the 10 total parts

[2]

- (b) The area of Part A is $18k$.

Write an expression, in terms of k , for the area of Part B.
Give your answer in its simplest form.

$18k \div 3$ ← Dividing the $18k$ by the 3 parts for A finds that 1 part is worth $6k$

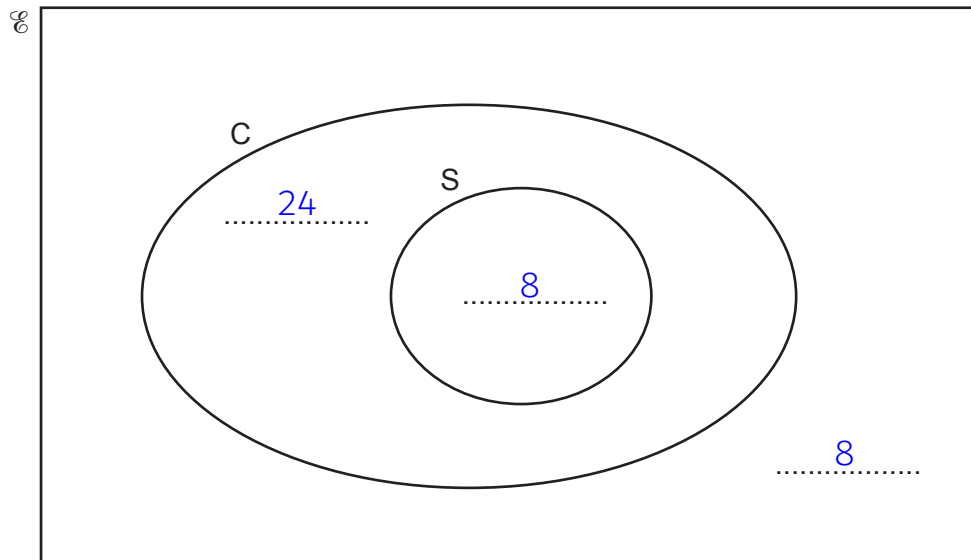
$6k \times 7$ ← Multiplying the value of 1 part by the 7 parts for B finds that the area of B is $42k$

(b) $42k$ [2]

13 40 people are asked if they like spiders (S) and if they like cats (C).

- 32 people like cats.
- The number of people who like spiders is the same as the number of people who don't like either spiders or cats.

Complete the Venn diagram to show this information.



[3]

$40 - 32$

Subtracting the 32 people who like cats from the 40 people finds that 8 people do not like cats. This must go in the outside. It must also go in S as the number of people who like spiders is the same as the number of people who don't like either spiders or cats.

$32 - 8$

Subtracting the 8 in S from the 32 who like cats finds that 24 like cats and do not like spiders

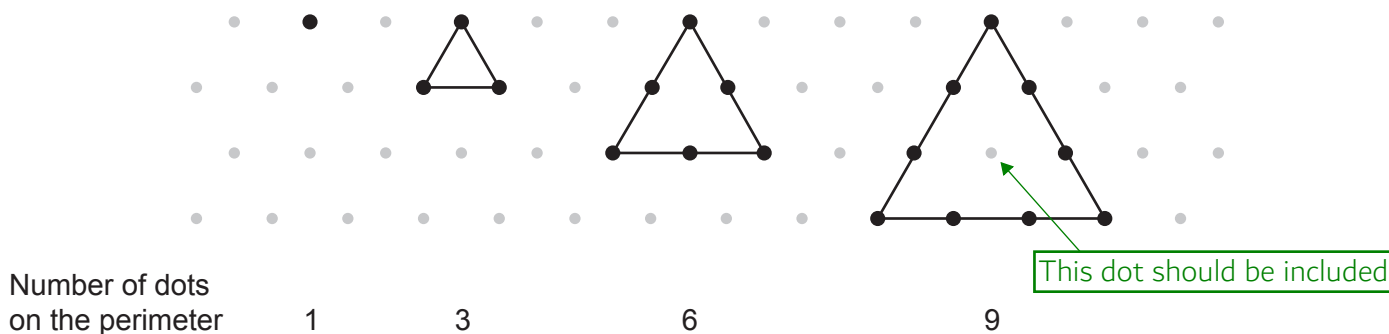
- 14 (a) (i) Write down the 4th term of this sequence of numbers.

1	4	9	16.....	25	36	49	
1^2	2^2	3^2	4^2	5^2	6^2	7^2	[1]

- (ii) Write down the name for the sequence of numbers.

(a)(ii) Square numbers [1]

- (b) (i) Amit draws these four diagrams.
Amit writes the number of dots on the perimeter underneath each diagram.



Amit says

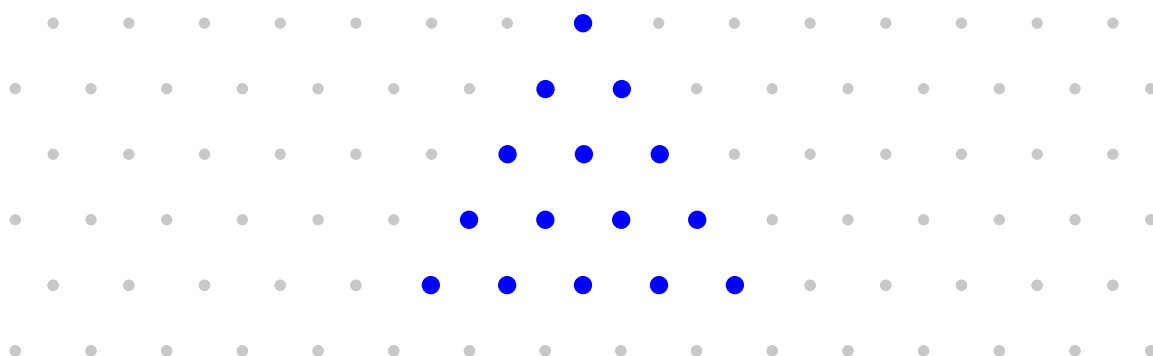
My diagrams show the first four triangular numbers.

Complete this statement.

Amit is incorrect because the 4th triangular number is 10

..... It is not the perimeter of the triangles which make the triangular numbers. It would be the number of dots inside as well [1]

- (ii) Use the grid below to draw the correct diagram for the 5th triangular number.



1, then 2, then 3, then 4, then 5 dots. The total number of dots is the triangular number. So the 5th triangular number is 15

[1]

- 15 (a) Heidi and Ben both work with the same positive number N .

Heidi works out $\frac{5}{8} \times N$.

Ben works out $0.63 \times N$.

Tick (✓) the correct statement.

Heidi gets a larger answer than Ben	
Heidi gets a smaller answer than Ben	✓
Heidi gets the same answer as Ben	

Give a reason why you ticked the statement.

$$\frac{5}{8} \times 100 = 62.5$$

If N was 100, Heidi would get 62.5 and Ben would get 63. 62.5 is smaller than 63

$$0.63 \times 100 = 63$$

[2]

- (b) Heidi correctly works out the area of a circle with radius 10 cm.

Heidi uses the formula $A = \pi r^2$.

Heidi's answer is 314.1592654 cm^2 .

Ben correctly works out the area of the same circle using the same formula.

Ben's answer is bigger than Heidi's answer.

Show how this can happen.

[2]

$$3.142 \times 10^2 = 314.2$$

Rounding π to 3 decimal places gives a greater value than using the exact value of π

- 16** A fair four-sided dice is numbered 3, 4, 5 and 6.
The dice is rolled twice and the two scores are multiplied together.

(a) Complete the table to show all the possible outcomes.

		First roll			
Second roll	×	3	4	5	6
	3	9	12	15	18
	4	12	16	20	24
	5	15	20	25	30
	6	18	24	30	36

$$\begin{array}{l} 3 \times 3 = 9 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \end{array}$$

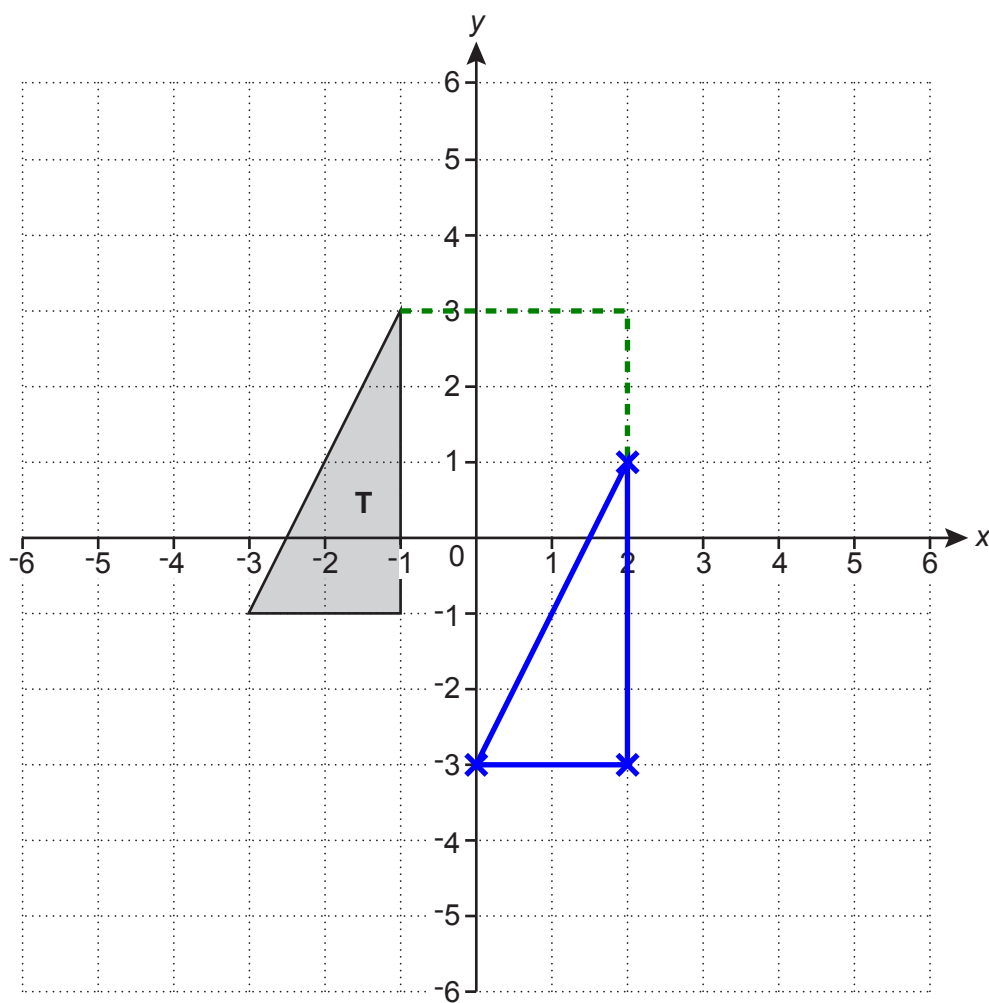
[1]

(b) Find the probability that the outcome is a multiple of 8.

(b) $\frac{3}{16}$ [2]

The outcomes which are multiples of 8 are highlighted in green. This is 3 out of the 16 possible outcomes

- 17 Triangle **T** is drawn on a coordinate grid.



Translate triangle **T** by vector $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$.

[2]

Moving the triangle 3 in the x-direction (3 to the right) and -2 in the y-direction (2 down)

- 18 (a) The price of a laptop is reduced in a January sale from £450 to £382.50.

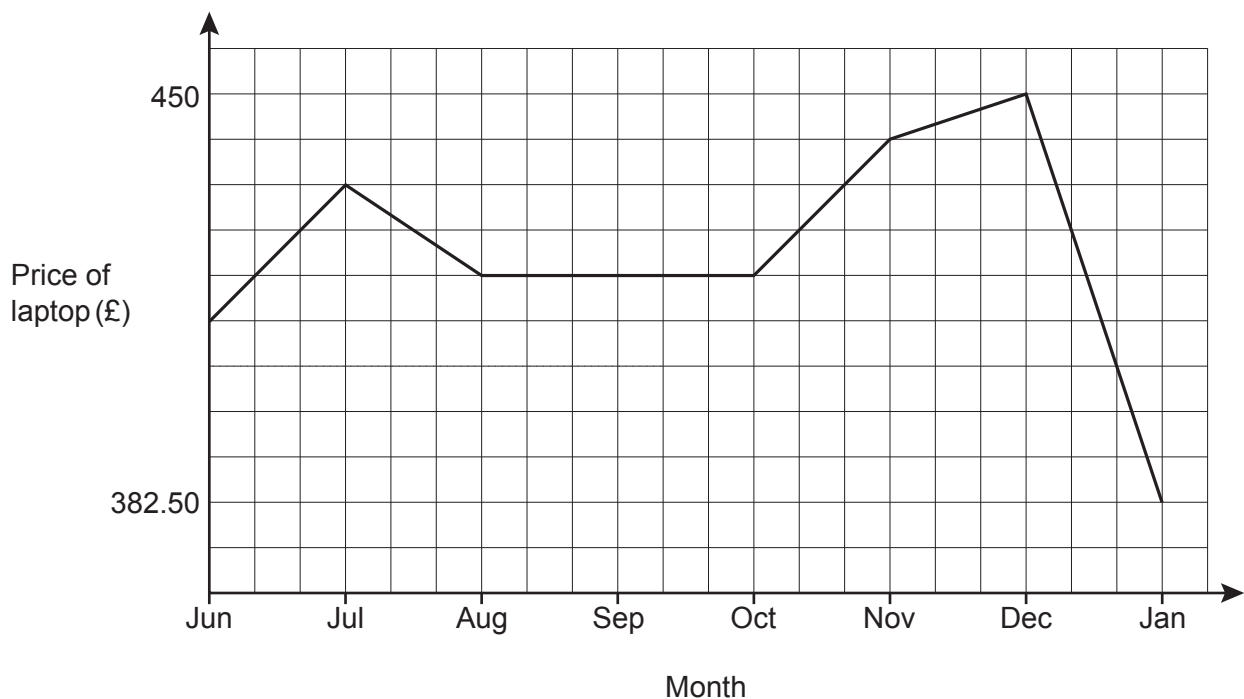
Work out the percentage reduction in the price of the laptop.

$450 - 382.50$ ← Subtracting the £382.50 from the original £450 finds that the reduction is £67.50

$\frac{67.50}{450} \times 100$ ← Putting the £67.50 reduction over the original 450 expresses the reduction as a fraction of the original price. Multiplying this by 100 converts the fraction to a percentage

(a) 15 % [3]

- (b) The graph shows the price of the laptop in the months before the January sale.

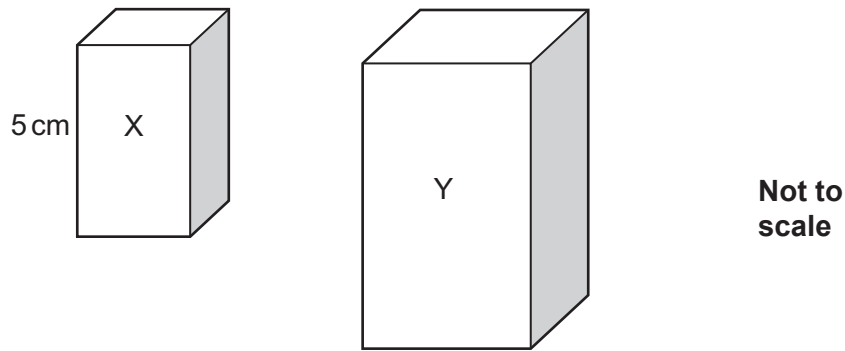


Explain why this graph is misleading.

Vertical axis does not start at 0

..... This could be misleading as it looks like there is a huge drop in price from December to January, but it is only a 15% drop [1]

- 19 The diagram shows two similar cuboids, X and Y.



Cuboid X has a square base with area 16 cm^2 and height 5 cm.

Cuboid Y has a square base with area 36 cm^2 .

Work out the height of cuboid Y.

You must show your working.

$$36 \div 16$$

Dividing the area of the square base of Y by the area of the square base of X finds that the area scale factor from X to Y is 2.25

$$\sqrt{2.25}$$

The unit of area is cm^2 . The unit of length is cm. So square rooting the area scale factor finds that the length scale factor is 1.5

$$5 \times 1.5$$

Multiplying the height of X by the length scale factor finds that the height of Y is 7.5 cm

..... 7.5 cm [4]

- 20 Sasha makes some cupcakes.
Each cupcake is topped with red or white or yellow icing.

$\frac{1}{3}$ of the cupcakes have red icing.

$\frac{1}{4}$ of the cupcakes have white icing.

- (a) Work out the fraction of the cupcakes that have yellow icing.

$$1 - \frac{1}{3} - \frac{1}{4}$$

There is 1 lot of cakes. Subtracting the $\frac{1}{3}$ which have red icing and the $\frac{1}{4}$ which have white icing leaves $\frac{5}{12}$ which have yellow icing

(a) $\frac{5}{12}$ [2]

- (b) Sasha makes all of the icing using butter and sugar in the ratio 1 : 2.
Each cupcake has 60g of icing.

Sasha uses 0.7 kg of butter to make the yellow icing.

Find the **total** number of cupcakes Sasha makes.
You must show your working.

$$0.7 \times 1000$$

1 kg = 1000 g. So multiplying the 0.7 kg by 1000 converts it to 700 g

$$700 \times 3$$

There is 700 g of butter, which is worth 1 part of the ratio. $1 + 2 = 3$ parts in total in the ratio. So multiplying the 700 g by 3 finds that there is 2100 g of yellow icing

$$2100 \div 60$$

Dividing the 2100 g of yellow icing by the 60 g of icing for each cupcake finds that there are 35 cupcakes with yellow icing

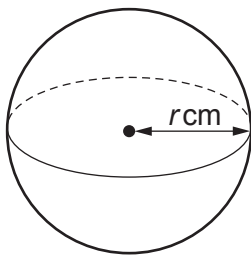
$$35 \div 5$$

$$7 \times 12$$

The 35 cupcakes with yellow icing is $\frac{5}{12}$ of the cupcakes.
Dividing the 35 by 5 finds that $\frac{1}{12}$ of the cupcakes is 7. Then multiplying this by 12 finds that there are 84 cupcakes in total

(b) 84 [5]

- 21 The diagram shows a sphere with radius r cm.



The sphere has a circumference of 50 cm.

Work out the surface area of the sphere.

[The surface area, A , of a sphere with radius r is $A = 4\pi r^2$.]

$$2\pi r = 50 \quad \leftarrow \text{Circumference} = 2\pi r, \text{ where } r \text{ is the radius}$$

$$50 \div 2\pi \quad \leftarrow \text{Dividing both sides by } 2\pi \text{ gets } r \text{ on its own, so finds that the radius is } 7.95... \text{ cm}$$

$$4\pi \times 7.9...^2 \quad \leftarrow \text{Using the formula for the surface area and substituting the exact value of the radius for } r$$

$$795.8 \dots \text{ cm}^2 \quad [4]$$

- 22 Kai plays an online game.
Kai collects diamonds and rubies.
Each diamond and each ruby is worth a fixed number of points.

In game 1, Kai collects 4 diamonds and 3 rubies and scores 47 points.
In game 2, Kai collects 3 diamonds and 5 rubies and scores 49 points.

Work out the number of points for a diamond and the number of points for a ruby.
You must show your working.

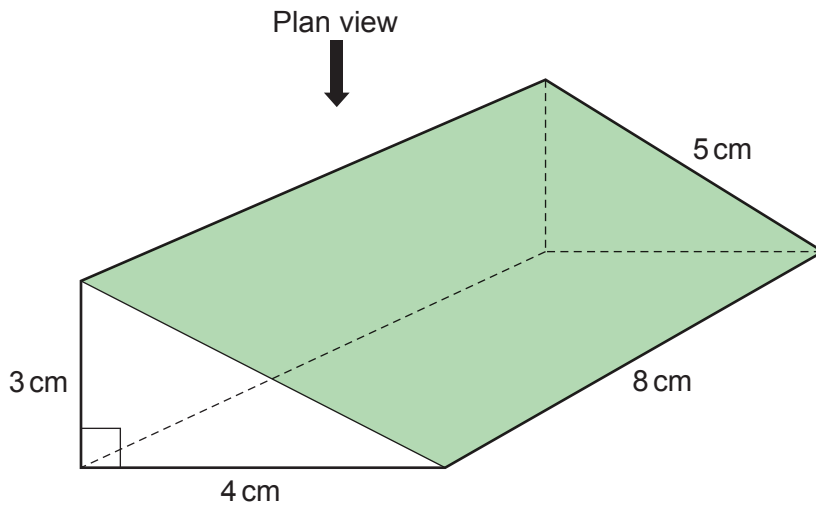
$4D + 3R = 47$	←	4 diamonds and 3 rubies scores 47 points. This forms the 1st equation
$3D + 5R = 49$	←	3 diamonds and 5 rubies scores 49 points. This forms the 2nd equation
$12D + 9R = 141$	↙	Multiplying all terms on both sides of the 1st equation by 3 to form the 3rd equation. Multiplying all terms on both sides of the 2nd equation by 4 to form the 4th equation. Now both the 3rd and 4th equation have the same number of D
$12D + 20R = 196$	↘	
$11R = 55$	←	Subtracting the 3rd equation from the 4th equation cancels out the D terms and leaves an equation just in terms of R. Dividing both sides by 11 finds that $R = 5$, so a ruby is worth 5 points
$4D + 15 = 47$	←	Substituting 5 for R in the 1st equation
$4D = 32$	←	Subtracting 15 from both sides to get the D term on its own. Then dividing both sides by 4 finds that $D = 8$, so a diamond is worth 8 points

diamond = ...8..... points

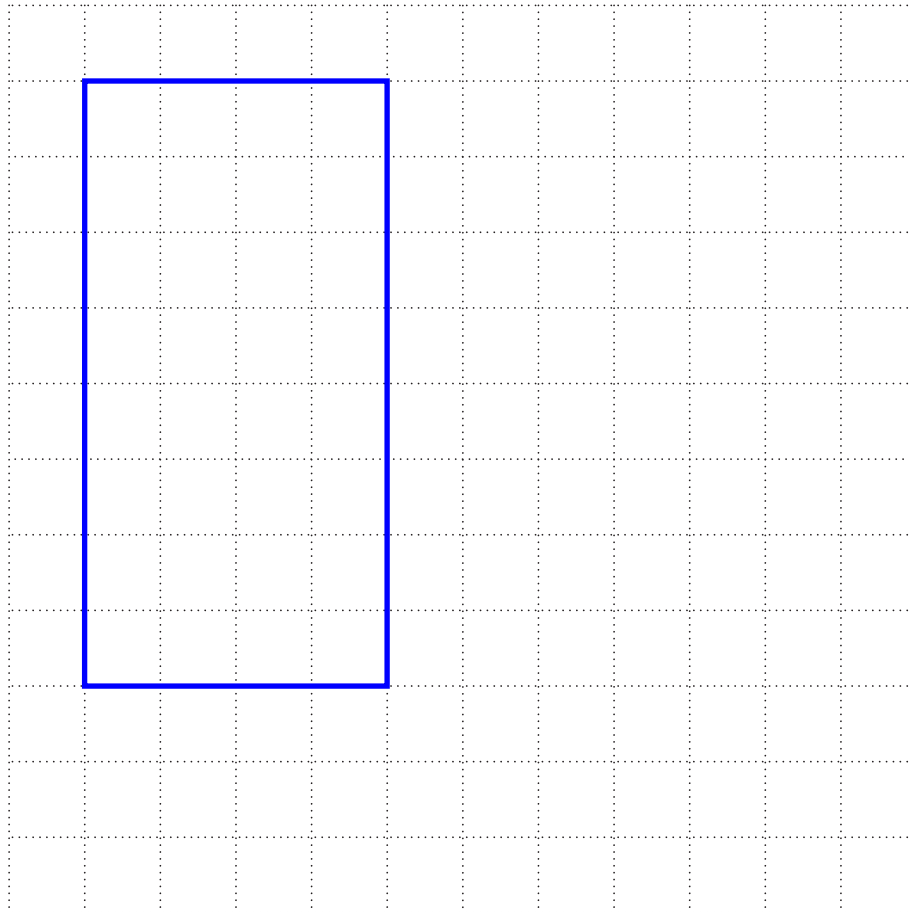
ruby = ...5..... points [5]

Turn over

- 23 The diagram shows a prism of length 8 cm.
The cross-section of the prism is a right-angled triangle.



Draw an accurate plan view of the prism on the one-centimetre grid below.



Only the highlighted rectangle is visible for the plan (the view from above). It will appear 8 cm long and 4 cm wide (not all the 5 cm is visible as it is slanted)

[2]

24 A kitchen has space for a fridge.

(a) The width, w , of the space is 70 cm, correct to the nearest centimetre.

Complete the error interval for the width, w .

$$70 \pm \frac{1}{2}$$

← Adding and subtracting half of what it is correct to the nearest (1 cm) finds the upper and lower bound

Lower bound

Upper bound

(a) 69.5 $\leq w <$ 70.5 [2]

(b) A fridge is advertised as having a width of 69.5 cm, correct to 1 decimal place.

Show that this fridge may **not** fit in the space.

[2]

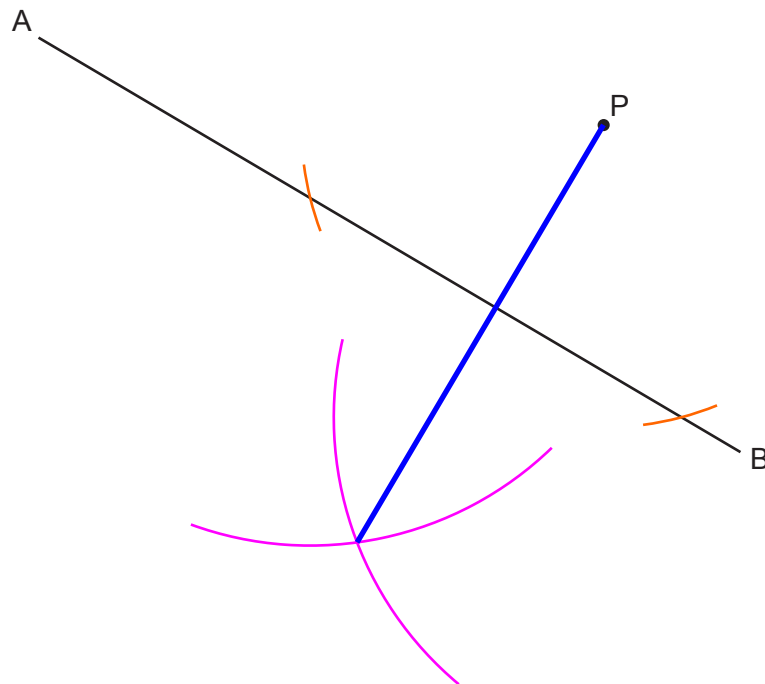
$$69.5 + \frac{0.1}{2}$$

← Adding half of what it is correct to the nearest (0.1 cm as it is correct to 1 decimal place) finds the upper bound for the width of the fridge is 69.55 cm

$$69.54 > 69.5$$

← The width of the fridge must be less than the upper bound of 69.55 cm so could be 69.54 cm, which is greater than the lower bound of the space 69.5 cm

- 25 Construct the perpendicular from the point P to the line AB.
Show all of your construction lines.



[2]

Using a compass, scribe two arcs on line AB from point P (shown in orange).

Using a compass, scribe arcs from both of the orange arcs on AB (shown in pink).

Using a ruler, draw a straight line from P to where the two pink arcs meet (shown in blue)

26 (a) Solve.

$$8x - 11 = 6x + 3$$

$$2x - 11 = 3 \quad \leftarrow \text{Subtracting } 6x \text{ from both sides to get all the } x \text{ on the same side}$$

$$2x = 14 \quad \leftarrow \text{Adding } 11 \text{ to both sides to eliminate the } -11 \text{ and get the } x \text{ term on its own}$$

Dividing both sides by 2 gets x on its own

$$(a) \quad x = \dots\dots\dots 7 \dots\dots\dots [3]$$

(b) Solve by factorising.

$$x^2 + 15x - 16 = 0$$

$$(x + 16)(x - 1) = 0 \quad \leftarrow \text{Factorised by finding two numbers which add to the 15 and multiply to the } -16. 16 \text{ and } -1 \text{ do this. Putting these two numbers in brackets with } x$$

Either $x + 16 = 0$ (so $x = -16$) or $x - 1 = 0$ (so $x = 1$)

$$(b) \quad x = \dots\dots\dots -16 \dots\dots\dots \text{ or } x = \dots\dots\dots 1 \dots\dots\dots [3]$$

END OF QUESTION PAPER

[illegible]

.CG Maths.