

Mock Set B – Paper 3

Solutions

For AQA GCSE Mathematics (8300)

Foundation tier • Paper 3 (Calculator)

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (2 marks)

- (a) Write two hundred and six thousand and fifty in figures.

Two hundred and six thousand is 206 000

Add fifty: $206\,000 + 50 = 206\,050$

Answer: 206 050

Tip: Write the thousands first, then fill the hundreds, tens and units. There are no hundreds here, so that digit is 0.

- (b) Write a number in the box to make this statement correct: $4.2 < \square < 4.25$

Write 4.2 as 4.20, so the number must be between 4.20 and 4.25.

Any number in between works, for example 4.21, 4.22, 4.23 or 4.24.

$4.2 < 4.23 < 4.25$

Answer: Any number between 4.2 and 4.25, e.g. 4.23

Tip: Put a zero on the end of 4.2 so both numbers have the same number of decimal places: 4.20 and 4.25.

2 (3 marks)

- (a) Here are the first four terms of a sequence: 62, 55, 48, 41. Write down the next term.

Each term is 7 less than the term before.

$$41 - 7 = 34$$

Answer: 34

- (b) Here are the first four terms of a different sequence: 96, 48, 24, 12. Write down the term-to-term rule.

$$96 \div 2 = 48, 48 \div 2 = 24, 24 \div 2 = 12$$

Each term is half of the term before.

Answer: Divide by 2 (halve)

Tip: Say what you do to one term to get the next term. “Goes down” or “ $-48, -24, -12$ ” is not a rule.

- (c) The term-to-term rule of another sequence is “multiply by 3 then subtract 4”. The 2nd term is 23. Work out the 1st term.

Work backwards from the 2nd term, using the inverse operations in reverse order.

Add 4: $23 + 4 = 27$

Divide by 3: $27 \div 3 = 9$

Check: $9 \times 3 - 4 = 27 - 4 = 23$ ✓

Answer: 9

Tip: Undo the steps in reverse order: undo “subtract 4” first (add 4), then undo “multiply by 3” (divide by 3).

3 (2 marks)

Work out $\frac{3}{8}$ of £62.80

Find $\frac{1}{8}$ first: $62.80 \div 8 = 7.85$

Then $\frac{3}{8}$: $7.85 \times 3 = 23.55$

Answer: £23.55

Tip: Divide by the bottom number, then multiply by the top number. On a calculator you can type $3 \div 8 \times 62.80$.

Marks: 1 mark for dividing by 8 (or 3×62.80). 1 mark for £23.55

4 (4 marks)

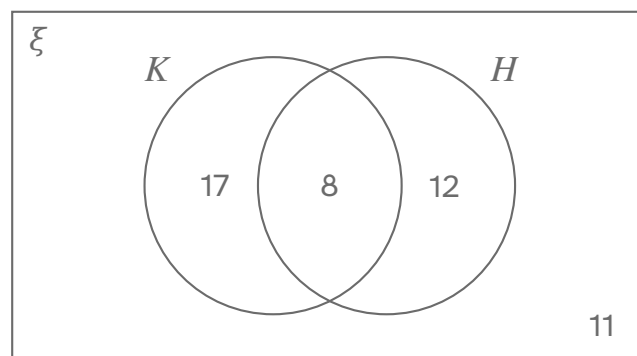
A holiday park offers two activities, kayaking and horse riding.

The Venn diagram shows information about the activities that 48 people did during their stay.

ξ = the 48 people

K = people who went kayaking

H = people who went horse riding



- (a) How many people went kayaking **and** horse riding?

Kayaking and horse riding is the overlap of the two circles.

The overlap has 8 people.

Answer: 8

- (b) How many people did **not** go horse riding?

Horse riding is the circle H : the people not in H are outside that circle.

Kayaking only: 17 Neither activity: 11

$$17 + 11 = 28$$

Answer: 28

Tip: “Not horse riding” includes the people outside both circles, not just the people in K only.

- (c) One of the people is chosen at random.

Work out the probability that this person did **exactly one** of the two activities.

Total number of people: $17 + 8 + 12 + 11 = 48$

Exactly one activity means kayaking only or horse riding only: $17 + 12 = 29$

$$\text{Probability} = \frac{29}{48}$$

Answer: $\frac{29}{48}$

Tip: “Exactly one” does not include the 8 people in the middle, who did both.

Marks: 1 mark for 29 on top or 48 on the bottom of a fraction. 1 mark for $\frac{29}{48}$.

5 (3 marks)

- (a) Round 0.063 71 to 2 significant figures.

The first significant figure is the first non-zero digit, 6.

The first two significant figures are 6 and 3.

The next digit is 7, so round up: 0.064

Answer: 0.064

Tip: Zeros at the start of a decimal are not significant. Start counting at the first non-zero digit.

- (b) The population of a city is 846 520. Round 846 520 to 1 significant figure.

The first significant figure is 8 (hundreds of thousands).

The next digit is 4, so round down.

Fill the other places with zeros: 800 000

Answer: 800 000

Tip: Keep the number the right size: 846 520 is about 800 000, not 8.

- (c) A 7-day bus ticket in the city costs £17.30. Work out the cost per day. Give your answer to the nearest penny.

$$17.30 \div 7 = 2.471428 \dots$$

The nearest penny is 2 decimal places.

The third decimal place is 1, so round down: £2.47

Answer: £2.47

Tip: The nearest penny means 2 decimal places of a pound.

6 (3 marks)

Three shops sell the same type of tennis ball.

Shop A	Shop B	Shop C
Tube of 4 balls £5.20 per tube	Box of 18 balls £22.50 per box	Tube of 3 balls £5.70 per tube Buy 2 tubes, get 1 more tube free

At which shop is the cost of one tennis ball the cheapest? You must show your working.

Shop A: $5.20 \div 4 = £1.30$ per ball

Shop B: $22.50 \div 18 = £1.25$ per ball

Shop C: pay for 2 tubes and get 3 tubes, so 9 balls cost $2 \times 5.70 = £11.40$

Shop C: $11.40 \div 9 = £1.266 \dots$, about £1.27 per ball

£1.25 is the lowest, so Shop B is the cheapest.

Answer: Shop B (A: £1.30, B: £1.25, C: £1.27 per ball)

Tip: For Shop C you pay for 2 tubes but get 3 tubes, so 9 balls cost £11.40. Dividing £5.70 by 3 ignores the free tube.

Marks: 1 mark for one correct cost per ball (or another fair comparison). 1 mark for all three shops worked out in a way you can compare. 1 mark for Shop B with correct values.

7 (2 marks)

Work out

$$\frac{\sqrt{58.3} + 2.6^3}{4.1 \times 1.7}$$

Give your answer to 2 decimal places.

Top: $\sqrt{58.3} = 7.635 \dots$ and $2.6^3 = 17.576$

$7.635 \dots + 17.576 = 25.211 \dots$

Bottom: $4.1 \times 1.7 = 6.97$

$25.211 \dots \div 6.97 = 3.617 \dots$

To 2 decimal places: 3.62

Answer: 3.62

Tip: Work out the top and the bottom separately, or put brackets round each of them on your calculator. Typing the whole thing in one go without brackets gives the wrong answer.

Marks: 1 mark for working out the top (25.21...) or the bottom (6.97). 1 mark for 3.62.

8 (3 marks)

Lola has a rectangular rug.

The area of the rug is 4.25 m^2

The length of the rug is 2.5 m

She wants to sew a fringe along all four edges of the rug.

She has 8.5 m of fringe.

Does Lola have enough fringe? Show working to support your answer.

Area = length $\times$ width, so width = area $\div$ length.

Width: $4.25 \div 2.5 = 1.7 \text{ m}$

Perimeter: $2.5 + 1.7 + 2.5 + 1.7 = 8.4 \text{ m}$

8.4 m is less than 8.5 m .

Yes, Lola has enough fringe.

Answer: Yes. The width is 1.7 m , so the perimeter is 8.4 m , which is less than 8.5 m

Tip: The fringe goes along all four edges, so you need the perimeter: add all four sides, not just two.

Marks: 1 mark for the width, 1.7 m . 1 mark for the perimeter, 8.4 m . 1 mark for Yes with 8.4 compared with 8.5 .

9 (4 marks)

A shop sells bags of ice.

(a) 5 bags of ice cost $\text{£}6.45$. Work out the cost of 12 bags of ice.

Cost of 1 bag: $6.45 \div 5 = \text{£}1.29$

Cost of 12 bags: $1.29 \times 12 = \text{£}15.48$

Answer: $\text{£}15.48$

Marks: 1 mark for the cost of 1 bag, $\text{£}1.29$ (or another useful amount). 1 mark for $\text{£}15.48$

- (b) Each large bag holds 4.5 kg of ice and costs £3.35. Toby needs 40 kg of ice. Work out the cost of the large bags he needs to buy.

Number of bags: $40 \div 4.5 = 8.88 \dots$

8 bags only hold 36 kg, which is not enough, so he needs 9 bags.

Cost: $9 \times 3.35 = £30.15$

Answer: £30.15

Tip: He needs at least 40 kg, so round the number of bags **up**. With 8 bags he would be 4 kg short.

Marks: 1 mark for $40 \div 4.5$ (or 8.8 ... or 9 bags). 1 mark for £30.15

10 (4 marks)

- (a) Write a different prime number in each box: + = 36

Try primes less than 36: is 36 minus the prime also prime?

$36 - 5 = 31$, and 31 is prime.

$5 + 31 = 36$

Other answers: $7 + 29$, $13 + 23$, $17 + 19$

Answer: e.g. $5 + 31$ (or $7 + 29$, $13 + 23$, $17 + 19$)

- (b) Write a square number in the first box and a cube number in the second box:

+ = 33

Cube numbers less than 33: 1, 8, 27

$33 - 1 = 32$ (not square), $33 - 8 = 25$ (square), $33 - 27 = 6$ (not square)

$25 + 8 = 33$

Answer: $25 + 8 = 33$

Tip: There are only three cube numbers less than 33, so try each one.

- (c) Write a multiple of 6 in the first box and a multiple of 8 in the second box. Both numbers must be greater than 50: $\square - \square = 10$

Multiples of 8 greater than 50: 56, 64, 72, 80, ...

Add 10 to each and test for a multiple of 6:

$$56 + 10 = 66 = 6 \times 11 \quad \checkmark$$

$$66 - 56 = 10$$

Other answers: $90 - 80$, $114 - 104$, ...

Answer: e.g. $66 - 56 = 10$ (or $90 - 80$, $114 - 104$, ...)

Tip: List multiples of 8, add 10 to each and check whether the answer is in the 6 times table.

Marks: 2 marks for a correct pair with both numbers over 50. 1 mark for a multiple of 6 and a multiple of 8 with a difference of 10 (e.g. $18 - 8$).

11 (4 marks)

40 teams took part in an escape room challenge. The table shows the times they took.

Time (t minutes)	Frequency
$20 < t \leq 30$	3
$30 < t \leq 40$	9
$40 < t \leq 50$	16
$50 < t \leq 60$	12

- (a) Write down the modal class.

The modal class is the class with the highest frequency.

The highest frequency is 16.

Answer: $40 < t \leq 50$

- (b) Work out an estimate of the mean time.

Use the midpoint of each class.

Time (t minutes)	Frequency	Midpoint	Freq $\times$ midpoint
$20 < t \leq 30$	3	25	75
$30 < t \leq 40$	9	35	315
$40 < t \leq 50$	16	45	720
$50 < t \leq 60$	12	55	660
Total	40		1770

Total of frequency $\times$ midpoint: $75 + 315 + 720 + 660 = 1770$

Estimate of the mean: $1770 \div 40 = 44.25$ minutes

Answer: 44.25 minutes

Tip: Divide by the total frequency (40), not by the number of classes (4).

Marks: 1 mark for using the midpoints. 1 mark for multiplying by the frequencies and adding (1770). 1 mark for 44.25.

12 (2 marks)

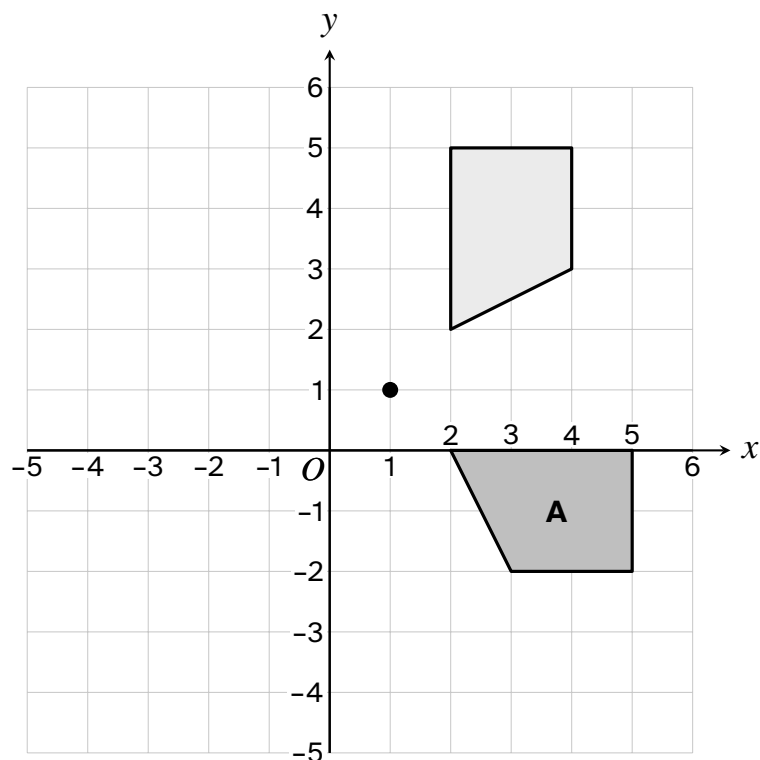
Shape A is drawn on a coordinate grid.

Rotate shape A 90° anticlockwise about (1, 1)

Use tracing paper: trace shape A, put your pencil on (1, 1) and turn the paper a quarter turn anticlockwise.

Or, from (1, 1): the vertex (2, 0) is 1 right and 1 down; after the turn it is 1 right and 1 up, at (2, 2).

The image has vertices (2, 2), (2, 5), (4, 5) and (4, 3).



Answer: Image with vertices (2, 2), (2, 5), (4, 5), (4, 3)

Tip: Anticlockwise is the opposite way to the hands of a clock. Check the direction before you turn the tracing paper.

Marks: 2 marks for a correct rotation. 1 mark for a rotation of 90° anticlockwise about a different point, or 90° clockwise about (1, 1).

13 (2 marks)

A school is carrying out a survey about school lunches.

(a) Is each type of data discrete or continuous?

	Discrete	Continuous
The number of students in each tutor group	✓	
The time a student waits in the lunch queue		✓
The mass of a portion of pasta		✓

Discrete data can be counted: you cannot have half a student.

Continuous data is measured: time and mass can take any value in a range.

Number of students: discrete. Waiting time: continuous. Mass: continuous.

Answer: Discrete, Continuous, Continuous

- (b) Nikhil asks 40 students in Year 7 what they think of the school lunches. The school has Years 7 to 11. Give one reason why his sample may not represent the views of the whole school.

He only asks students from one year group.

Students in other years (8 to 11) may have different views, so the sample is biased.

Answer: He only asks Year 7, and students in other years may think differently.

Tip: Say what is wrong with **who** he asks: only one year group. "The sample is too small" is not the main problem here.

14 (2 marks)

Write these fractions in order of size, smallest first: $\frac{2}{3}$, $\frac{9}{7}$, $\frac{5}{8}$, $\frac{13}{20}$

Change each fraction to a decimal.

$$\frac{2}{3} = 0.666 \dots \quad \frac{9}{7} = 1.285 \dots \quad \frac{5}{8} = 0.625 \quad \frac{13}{20} = 0.65$$

$\frac{9}{7}$ is the only fraction greater than 1, so it is the largest.

Order: 0.625, 0.65, 0.666 ..., 1.285 ...

Answer: $\frac{5}{8}$, $\frac{13}{20}$, $\frac{2}{3}$, $\frac{9}{7}$

Tip: The fraction with the biggest denominator is not always the largest. Change them all to decimals with your calculator.

Marks: 2 marks for the correct order. 1 mark for all four changed to decimals (or percentages or a common denominator) correctly, or three in the correct order.

15 (4 marks)

Harvey, Lewis and Felix raise money for a charity.

Lewis raises £18 more than Harvey.

Felix raises twice as much as Lewis.

Altogether they raise £350

Work out how much money each of them raised.

Let Harvey raise £ x .

Lewis: $x + 18$ Felix: $2(x + 18) = 2x + 36$

Total: $x + (x + 18) + (2x + 36) = 350$

$$4x + 54 = 350$$

$$4x = 296, \text{ so } x = 74$$

Harvey £74, Lewis $74 + 18 = £92$, Felix $2 \times 92 = £184$

Check: $74 + 92 + 184 = 350$ ✓

Answer: Harvey £74, Lewis £92, Felix £184

Tip: Felix raised twice as much as **Lewis**, not twice as much as Harvey: $2(x + 18)$, not $2x$.

Marks: 1 mark for writing two of the amounts in terms of one unknown. 1 mark for an equation for the total, $4x + 54 = 350$. 1 mark for Harvey's £74. 1 mark for all three amounts.

16 (2 marks)

The area of a classroom display board is 1.8 m^2

Simran says,

‘There are 100 cm in a metre, so the area of the board is 180 cm^2 ’

Is Simran correct? Show working to support your answer.

$1 \text{ m} = 100 \text{ cm}$, so 1 m^2 is a square 100 cm by 100 cm.

$$1 \text{ m}^2 = 100 \times 100 = 10\,000 \text{ cm}^2$$

$$1.8 \text{ m}^2 = 1.8 \times 10\,000 = 18\,000 \text{ cm}^2$$

18 000 is not 180, so Simran is not correct.

Answer: No. $1.8 \text{ m}^2 = 18\,000 \text{ cm}^2$

Tip: Area units are squared. There are 100 cm in a metre in **both** directions, so multiply by $100 \times 100 = 10\,000$.

Marks: 1 mark for $1 \text{ m}^2 = 10\,000 \text{ cm}^2$ (or $\times 10\,000$). 1 mark for No with $18\,000 \text{ cm}^2$.

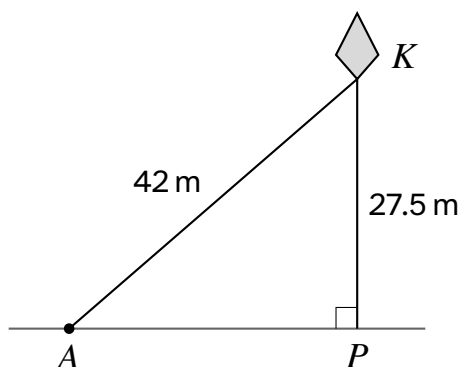
17 (3 marks)

Esther is flying a kite, K .

The string of the kite is tied to a peg at A on horizontal ground.

The string is a straight line 42 m long.

The kite is 27.5 m vertically above the point P on the ground.



Not drawn accurately

Work out the distance AP .

Give your answer to 1 decimal place.

The string AK is the hypotenuse, because it is opposite the right angle.

$$AP^2 + 27.5^2 = 42^2$$

$$AP^2 = 42^2 - 27.5^2 = 1764 - 756.25 = 1007.75$$

$$AP = \sqrt{1007.75} = 31.745 \dots$$

To 1 decimal place: 31.7 m

Answer: 31.7 m

Tip: You are finding a shorter side, so **subtract** the squares. Adding gives 50.2 m, which is longer than the string.

Marks: 1 mark for $42^2 - 27.5^2$. 1 mark for $\sqrt{1007.75}$. 1 mark for 31.7.

18 (3 marks)

- (a) $5(y + 3) \equiv 5y + 15$ is an equation, an expression, a formula or an identity?

The $\equiv$ sign means the two sides are equal for **every** value of y .

$5(y + 3)$ expands to $5y + 15$, so this is always true.

It is an identity.

Answer: Identity

Tip: An equation is only true for some values of the letter. An identity is true for all values: look for the $\equiv$ sign.

- (b) Show that

$$4(3x - 2) - 5(x - 3) \equiv 7(x + 1)$$

Expand the left-hand side: $4(3x - 2) = 12x - 8$ and $-5(x - 3) = -5x + 15$

$$12x - 8 - 5x + 15 = 7x + 7$$

Expand the right-hand side: $7(x + 1) = 7x + 7$

Both sides are $7x + 7$, so $4(3x - 2) - 5(x - 3) \equiv 7(x + 1)$

Answer: $12x - 8 - 5x + 15 = 7x + 7$ and $7(x + 1) = 7x + 7$

Tip: $-5 \times -3 = +15$. A minus sign in front of a bracket changes the sign of every term inside.

Marks: 1 mark for expanding both brackets on the left correctly. 1 mark for showing both sides are $7x + 7$.

19 (4 marks)

Aaliyah buys a used electric car for £21 400

- (a) In this part, assume the value of the car decreases by 13% each year.
Work out the value of the car after 3 years.

Decreasing by 13% leaves $100\% - 13\% = 87\%$, so multiply by 0.87 each year.

$$21\,400 \times 0.87^3$$

$$= 21\,400 \times 0.658\,503 = 14\,091.964\,2$$

To the nearest penny: £14 091.96

Answer: £14 091.96

Tip: Each year's 13% is taken from the new, lower value. Taking off $3 \times 13\% = 39\%$ of £21 400 gives the wrong answer (£13 054).

Marks: 1 mark for using 0.87 (or finding 13% of £21 400). 1 mark for a full method for 3 years. 1 mark for £14 091.96

- (b) In fact, the value decreases by 20% in the first year, then 13% in each of the next two years. What does this mean about the value of the car after 3 years?

A bigger decrease in the first year leaves a smaller value.

The next two years then take 13% off a smaller amount, but the value stays lower.

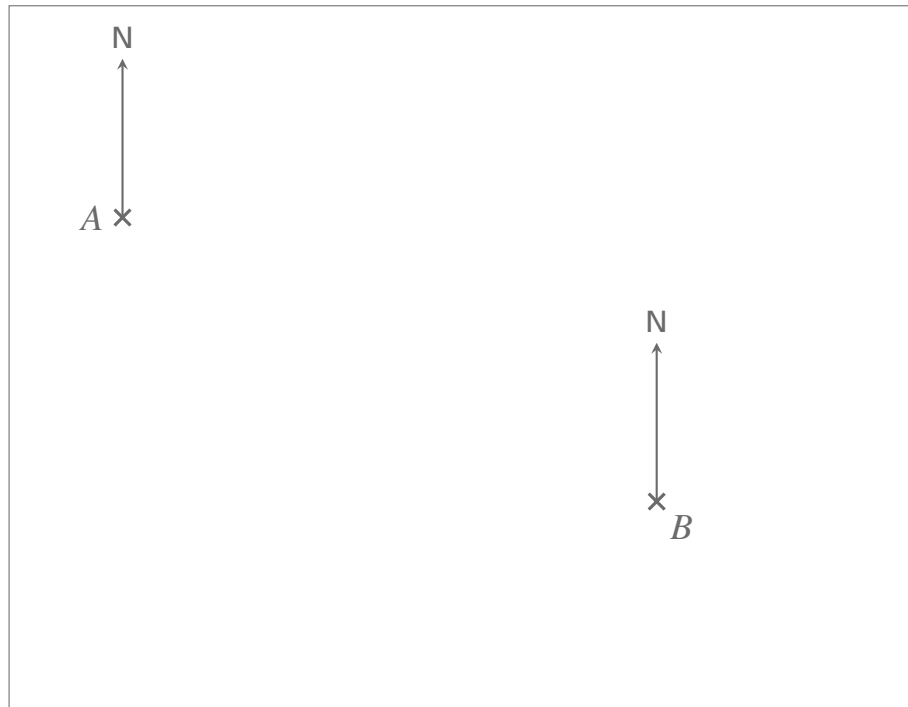
$$21\,400 \times 0.8 \times 0.87^2 = £12\,958.13, \text{ which is less than } £14\,091.96$$

Answer: It is less than the answer to part (a)

20 (3 marks)

The scale drawing shows two checkpoints, A and B , on an orienteering course.

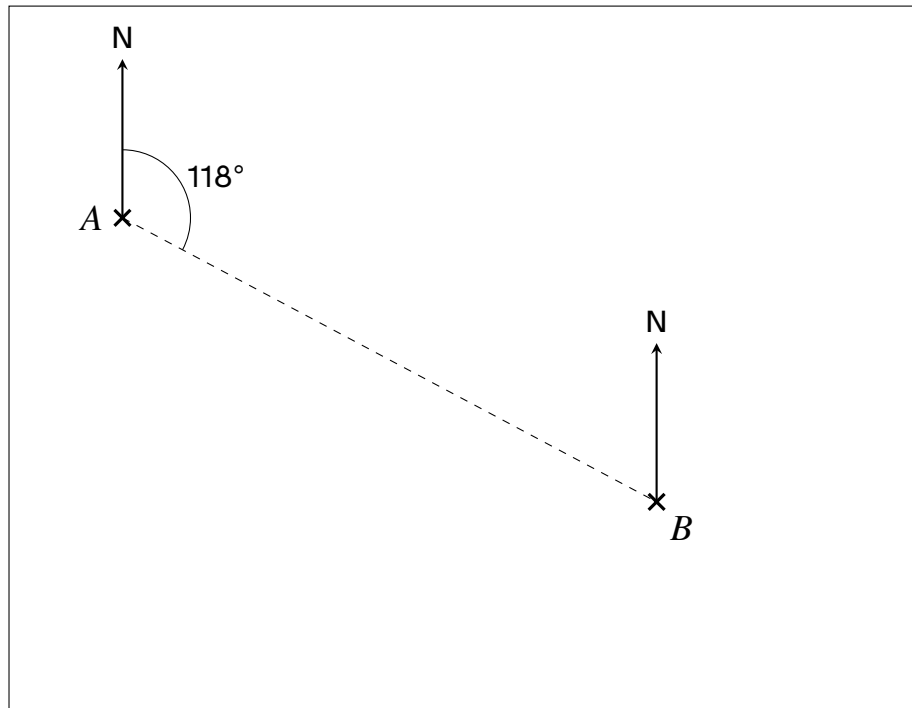
Scale: 1 cm represents 500 m



- (a) Measure the bearing of B from A .

Put the centre of your protractor on A , with 0° along the North line.

Measure clockwise from North to the line AB .



The angle is 118° .

Answer: 118°

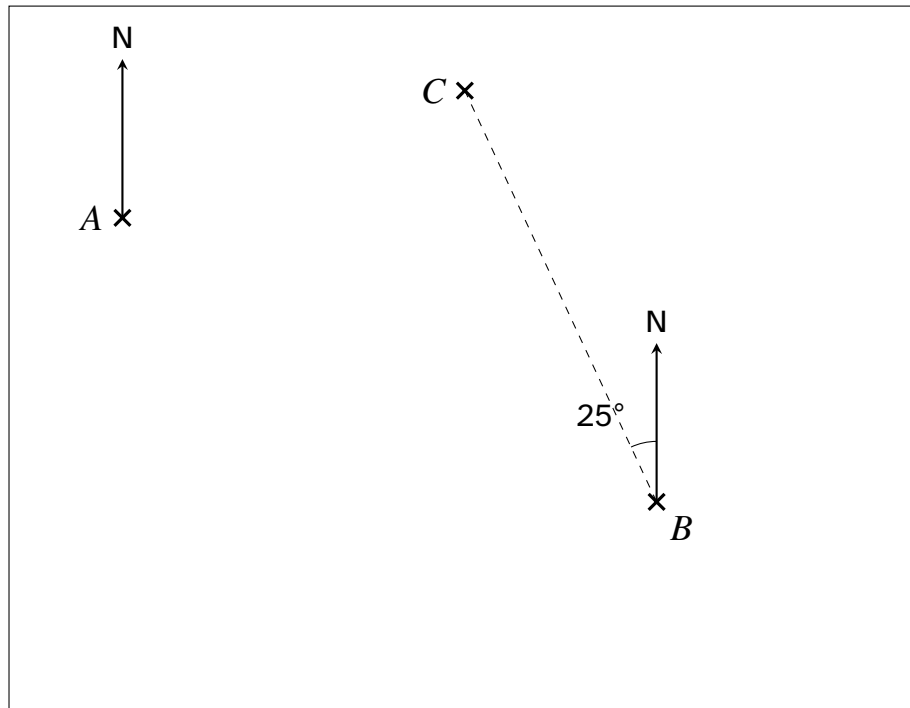
Tip: Bearings are measured clockwise from North. Use the scale on your protractor that starts at 0° on the North line.

- (b) Checkpoint *C* is 3 km from *B* on a bearing of 335°
Mark the position of *C* with a cross (x).

Distance on the drawing: $3 \text{ km} = 3000 \text{ m}$, $3000 \div 500 = 6 \text{ cm}$

335° is $360^\circ - 335^\circ = 25^\circ$ anticlockwise from North.

From *B*, measure 25° to the left of the North line, draw a line and mark *C* 6 cm along it.



Answer: *C* marked 6 cm from *B* on a bearing of 335°

Tip: Measure the bearing at *B*, using the North line at *B*. For a bearing over 180° , measure $360^\circ - 335^\circ = 25^\circ$ anticlockwise from North.

Marks: 1 mark for the correct direction (335° from *B*). 1 mark for the correct distance (6 cm).

21 (2 marks)

Factorise $x^2 - 144$

$$144 = 12^2, \text{ so } x^2 - 144 = x^2 - 12^2$$

This is the difference of two squares: $a^2 - b^2 = (a + b)(a - b)$

$$x^2 - 144 = (x + 12)(x - 12)$$

Check: $(x + 12)(x - 12) = x^2 - 12x + 12x - 144 = x^2 - 144$ ✓

Answer: $(x + 12)(x - 12)$

Tip: There is no x term, so the numbers in the brackets must be the same with opposite signs.

Marks: 2 marks for $(x + 12)(x - 12)$. 1 mark for $(x + a)(x - b)$ where $a \times b = 144$ or $a = b$.

22 (2 marks)

- (a) Write down the gradient of the line $y = 4 - 3x$

Rewrite in the form $y = mx + c$: $y = -3x + 4$

The gradient is the number in front of x : -3

Answer: -3

Tip: The gradient is the number multiplying x , including its sign, wherever it is in the equation.

- (b) Which of these lines is parallel to the line $y = 2x + 5$?

Circle your answer.

Options: $y = 5x + 2$, $y = -2x + 5$, $2y = 4x + 1$, $y = \frac{1}{2}x - 5$

Parallel lines have the same gradient, so look for gradient 2.

$2y = 4x + 1$ gives $y = 2x + \frac{1}{2}$, which has gradient 2.

Answer: $2y = 4x + 1$

Tip: Make y the subject before reading the gradient: divide every term by 2.

23 (3 marks)

Elena and Ibrahim each throw the same paper cup in the air many times.
They record whether the cup lands on its side.

Elena throws the cup 40 times. It lands on its side 17 times.

Ibrahim throws the cup 150 times.

For Ibrahim, the relative frequency of the cup landing on its side is 0.62

- (a) How many more times did the cup land on its side for Ibrahim than for Elena?

Number of times = relative frequency $\times$ number of throws

Ibrahim: $0.62 \times 150 = 93$ times

$93 - 17 = 76$

Answer: 76

Tip: Relative frequency is a fraction of the throws, so multiply it by the number of throws to get a number of times.

Marks: 1 mark for 0.62×150 (93). 1 mark for 76.

- (b) Whose results give the better estimate of the probability that the cup lands on its side? Give a reason for your answer.

Ibrahim threw the cup 150 times and Elena only 40 times.

More trials give a more reliable estimate.

Answer: Ibrahim's, because he threw the cup more times (150 compared with 40).

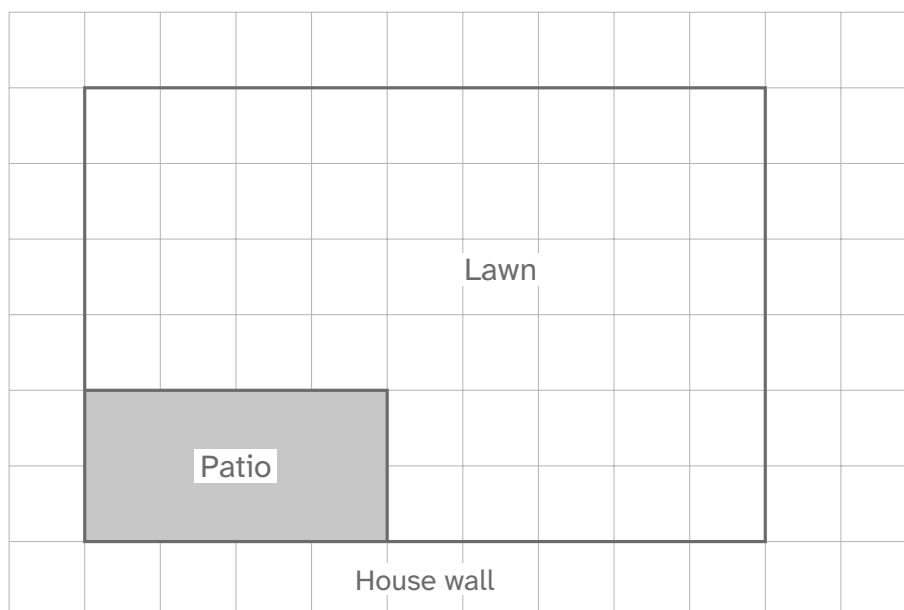
Tip: Give the reason with the numbers: Ibrahim did more throws. Saying the cup is "fair" or "random" does not earn the mark.

24 (5 marks)

The plan shows Marcus's garden, drawn on a centimetre grid.

The garden is a rectangle. Part of the garden is a patio. The rest is lawn.

Scale 1 : 200



Turf costs £5.60 per m^2 for the first 100 m^2 and £3.90 per m^2 for each m^2 after that. Work out the total cost of turf for the whole lawn.

Scale 1:200 means 1 cm on the plan is 200 cm = 2 m in real life.

Garden: 9 cm by 6 cm on the plan, so 18 m by 12 m. Area = $18 \times 12 = 216 \text{ m}^2$

Patio: 4 cm by 2 cm on the plan, so 8 m by 4 m. Area = $8 \times 4 = 32 \text{ m}^2$

Lawn: $216 - 32 = 184 \text{ m}^2$

First 100 m^2 : $100 \times 5.60 = \text{£}560$

The other $184 - 100 = 84 \text{ m}^2$: $84 \times 3.90 = \text{£}327.60$

Total: $560 + 327.60 = \text{£}887.60$

Answer: £887.60

Tip: Each 1 cm square on the plan is 2 m by 2 m, so it stands for 4 m^2 , not 2 m^2 . And only the area **over** 100 m^2 is charged at £3.90.

Marks: 1 mark for using the scale (e.g. 18 m and 12 m). 1 mark for the lawn area, 184 m^2 . 1 mark for £560 for the first 100 m^2 . 1 mark for 84 m^2 at £3.90. 1 mark for £887.60

25 (3 marks)

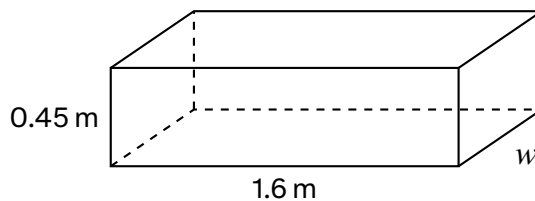
A stone bench is a solid cuboid.

It stands on horizontal ground.

The bench exerts a force of 2880 newtons (N) on the ground.

The pressure on the ground is 4500 N/m^2

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$



Not drawn accurately

Work out the width, w , of the bench.

Give your answer in centimetres.

Rearrange the formula: $\text{area} = \frac{\text{force}}{\text{pressure}}$

Area of the base: $2880 \div 4500 = 0.64 \text{ m}^2$

The base is a rectangle, so width = area $\div$ length: $0.64 \div 1.6 = 0.4 \text{ m}$

$0.4 \text{ m} = 0.4 \times 100 = 40 \text{ cm}$

The height, 0.45 m , is not needed.

Answer: 40 cm

Tip: Rearrange first: $\text{area} = \text{force} \div \text{pressure}$. Then divide by the length to get the width, and change metres to centimetres at the end.

Marks: 1 mark for the area, 0.64 m^2 . 1 mark for dividing the area by 1.6. 1 mark for 40 cm.

26 (3 marks)

A plank of wood is 4.7 m long, correct to the nearest 10 cm.
Gus is going to cut pieces of length 52 cm from the plank.
Assume no wood is wasted when he cuts it.

Gus says,

‘I can definitely cut 9 pieces from the plank.’

Show that Gus is **not** correct.

4.7 m to the nearest 10 cm means the plank could be as short as $470 - 5 = 465$ cm.

Shortest length: 465 cm

9 pieces need $9 \times 52 = 468$ cm

468 cm is more than 465 cm, so if the plank is at its shortest he cannot cut 9 pieces.

So Gus cannot be sure of 9 pieces: he is not correct.

Answer: The plank may be only 465 cm long, and 9 pieces need $9 \times 52 = 468$ cm, which is more than 465 cm.

Tip: “Definitely” means even in the worst case, so use the **lower bound**: half of 10 cm less than 4.7 m. Using 470 cm gives 9.04 pieces, which looks as if he is right.

Marks: 1 mark for the shortest possible length, 465 cm (or 4.65 m). 1 mark for $9 \times 52 = 468$ (or $465 \div 52$). 1 mark for comparing and saying he could be short.

27 (3 marks)

A chef makes a salad dressing by mixing olive oil and vinegar.

She uses 450 cm^3 of olive oil and 0.303 kg of vinegar.

The density of the olive oil is 0.92 g/cm^3

The density of the vinegar is 1.01 g/cm^3

The volume of the dressing is the volume of the oil plus the volume of the vinegar.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Work out the density of the salad dressing.

Give your answer to 2 decimal places.

Olive oil: mass = density $\times$ volume = $0.92 \times 450 = 414$ g

Vinegar: $0.303 \text{ kg} = 303 \text{ g}$, volume = mass $\div$ density = $303 \div 1.01 = 300 \text{ cm}^3$

Total mass: $414 + 303 = 717 \text{ g}$ Total volume: $450 + 300 = 750 \text{ cm}^3$

Density: $717 \div 750 = 0.956$

To 2 decimal places: 0.96 g/cm^3

Answer: 0.96 g/cm^3

Tip: You cannot find the density of a mixture by averaging the two densities. Find the total mass and the total volume, then divide. Change 0.303 kg into grams first.

Marks: 1 mark for the mass of the oil, 414 g (or the volume of the vinegar, 300 cm^3). 1 mark for total mass $\div$ total volume. 1 mark for 0.96 .
