GCSE
Maths

Spring Hub network meetings

Example questions and mark schemes

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Contents

November, Paper 2, Higher Tier, Question 8

8 The table shows information about the distances walked by 120 students on their way to school one week.

Distance, x (miles)	Frequency		
$0 < x \leqslant 5$	20		
$5 < x \leqslant 10$	48		
$10 < x \leqslant 15$	30		
$15 < x \leqslant 20$	22		
	Total = 120		

Work out an estimate for the mean distance.

[3 marks]

Question	Answer	Mark	Comments
8	[0, 5] × 20 + [5, 10] × 48 + [10, 15] × 30 + [15, 20] × 22 or 1170	M1	Must add 4 products
	their 1170 ÷ 120	M1dep	
	9.75 or $\frac{39}{4}$ or $9\frac{3}{4}$	A1	
	Additional Guidance		
	1170 ÷ 120 or 9.75 with $5 < x \leqslant 10$ on answer line		M2A0
	Do not allow M1 for working in the table if a different method is used in working lines		

Practice papers set 3, Paper 2, Foundation Tier, Question 27

27 A charity collection was made.

Information about the amounts given by men is shown in the table.

Amount, x (£)	Midpoint	Number of men	
$0 \leqslant x < 5$		11	
$5 \leqslant x < 10$		7	
$10 \leqslant x < 15$		2	
		Total = 20	

The mean amount given by **women** was £6.30 per person.

Compare the mean amounts given by men and women.

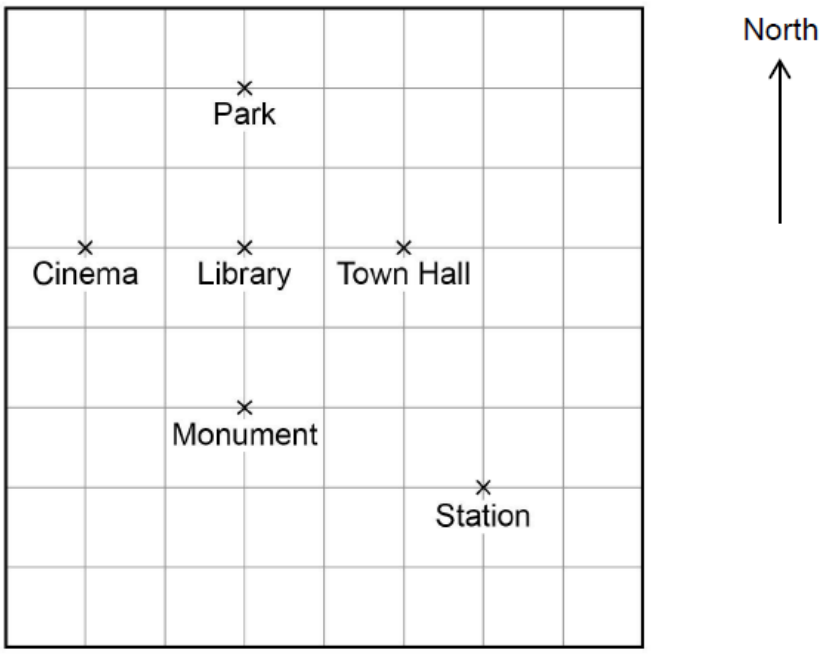
[4 marks]

Q	Answer	Mark	Comments
27	2.5(0) × 11 or 27.5(0) or 7.5(0) × 7 or 52.5(0) or 12.5(0) × 2 or 25	M1	
	their 27.5(0) + their 52.5(0) + their 25 or 105	M1dep	sum of fx
	their 105 ÷ 20 or 5.25	M1dep	
	5.25 and correct conclusion	A1	oe eg 5.25 and women gave more
	Additional Guidance		
	105 ÷ 3 = 35		M1M1M0A0

June, Paper 2, Foundation Tier, Question 8(d)

8 Here is a map of a town.

Scale: 1 cm represents 200 m



8 (c) What is the distance, in metres, from the Cinema to the Station?

[3 marks]

8 (d) Why might the shortest **walking** distance from the Cinema to the Station be greater than your answer to part (c)?

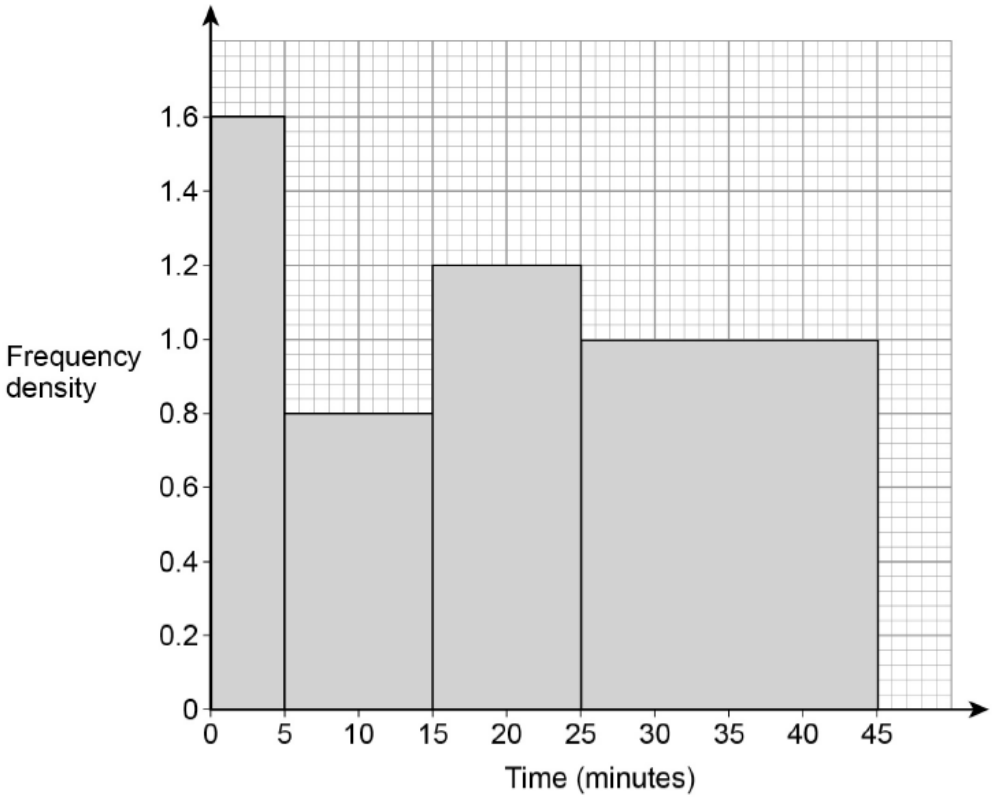
[1 mark]

Question	Answer	Mark	Comments
8(d)	Valid reason	B1	Indication that the shortest distance between two points is a straight line, but you can't generally walk in a straight line between two places in a town
	Additional Guidance		
	You would have to walk along the streets		B1
	There wouldn't be a straight road between them		B1
	You would have to walk along and then down		B1
	There might be buildings in the way		B1
	You can't go as the crow flies		B1
	There may be obstacles in the way		B1
	It isn't a straight path in real life		B1
	Can't go directly		B1
	There might be buildings in the way such as the library		B0
	The monument is in the way		B0
	It's not a walking route		B0
	There is more than one route		B0
	May have taken a different route		B0
	Walking is slower		B0
	You may need to go past the town hall		B0
	You might take a detour		B0

June, Paper 2, Higher Tier, Question 24

24 48 students completed some homework.

This histogram shows information about the times taken.



Work out an estimate of the interquartile range.

You **must** show your working.

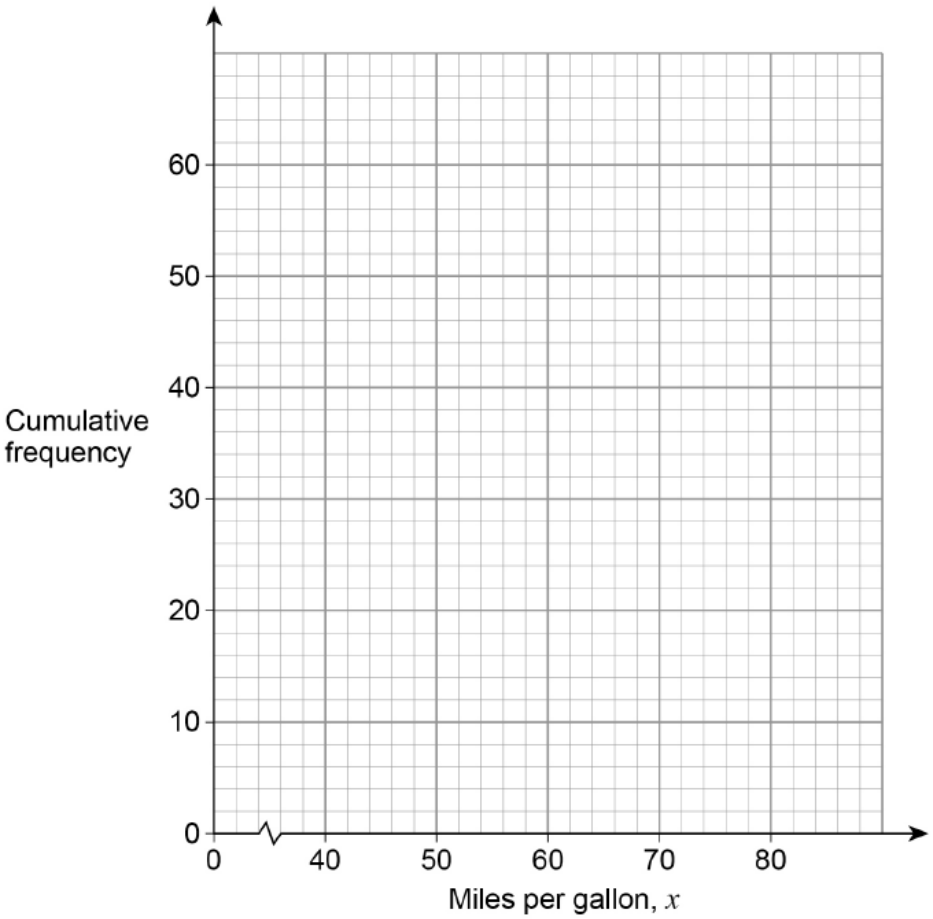
[4 marks]

Question	Answer	Mark	Comments
24	**Alternative method 1**		
	(LQ =) 10 and (UQ =) 33 and answer 23	B4	B3 (LQ =) 10 **and** (UQ =) 33 B2 (LQ =) 10 **or** (UQ =) 33 B1 Any two correct frequencies from 8, 8, 12 and 20
	Alternative method 2		
	(LQ =) 10.3125 and (UQ =) 33.75 and answer 23.4375	B4	B3 (LQ =) 10.3125 **and** (UQ =) 33.75 B2 (LQ =) 10.3125 **or** (UQ =) 33.75 B1 Any two correct frequencies from 8, 8, 12 and 20
	Additional Guidance		
	Alt 2 is using $\frac{48+1}{4}$ = 12.25 and $\frac{3(48+1)}{4}$ = 36.75 to work out quartiles		
	Correct frequencies must be for the correct bar		
	33.75 may come from $\frac{3}{4} \times 45$		B0
	Allow B1 for two correct frequencies even if not subsequently used		B1
	Frequency of 8 seen once with no other correct frequencies counts as one correct		
	Frequency of 8 seen twice counts as two correct		B1
	36 – 12 = 24 or 36.75 – 12.25 = 24.5 with < 2 correct frequencies		B0
	Answer 23 with neither quartile correct and < 2 correct frequencies		B0
	10-33 and 23		B4
	10-33		B3
	Do not allow dashes or vertical lines at 10 and/or 33 to imply correct quartiles		

November, Paper 1, Higher Tier, Question 22(b)

22 (a) Draw a cumulative frequency graph.

[3 marks]



22 (b) Use the graph to work out the interquartile range.

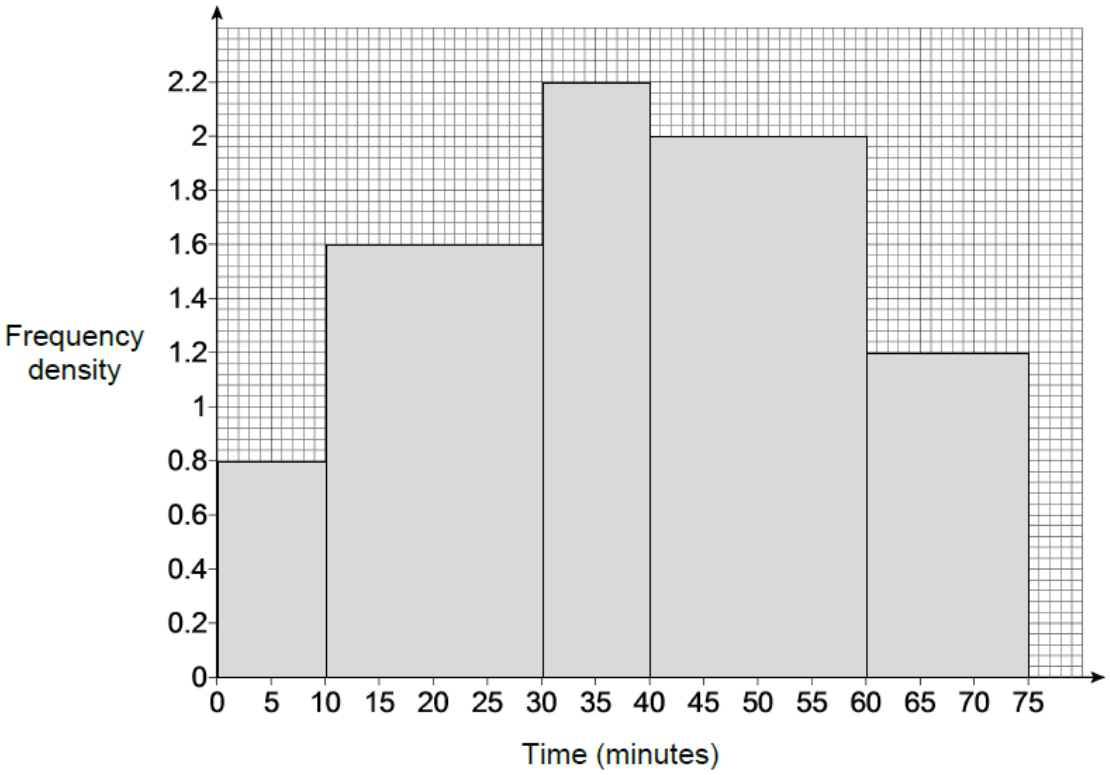
[2 marks]

Question	Answer	Mark	Comments
22(b)	One correct mpg reading for their graph from cf of 15(.25) or 45(.75) or horizontal lines from 15(.25) and 45(.75) only to their graph or 15(.25) and 45(.75) indicated as the cf values for the quartiles	M1	± 0.5 square ft their increasing graph may be on table
	Correct value for their increasing graph	A1ft	

Practice papers set 3, Paper 1, Higher Tier, Question 22

22 The histogram shows information about the times some students revised for a test.

The first bar represents students who revised for less than 10 minutes.



Estimate the number of students who revised for less than 45 minutes.

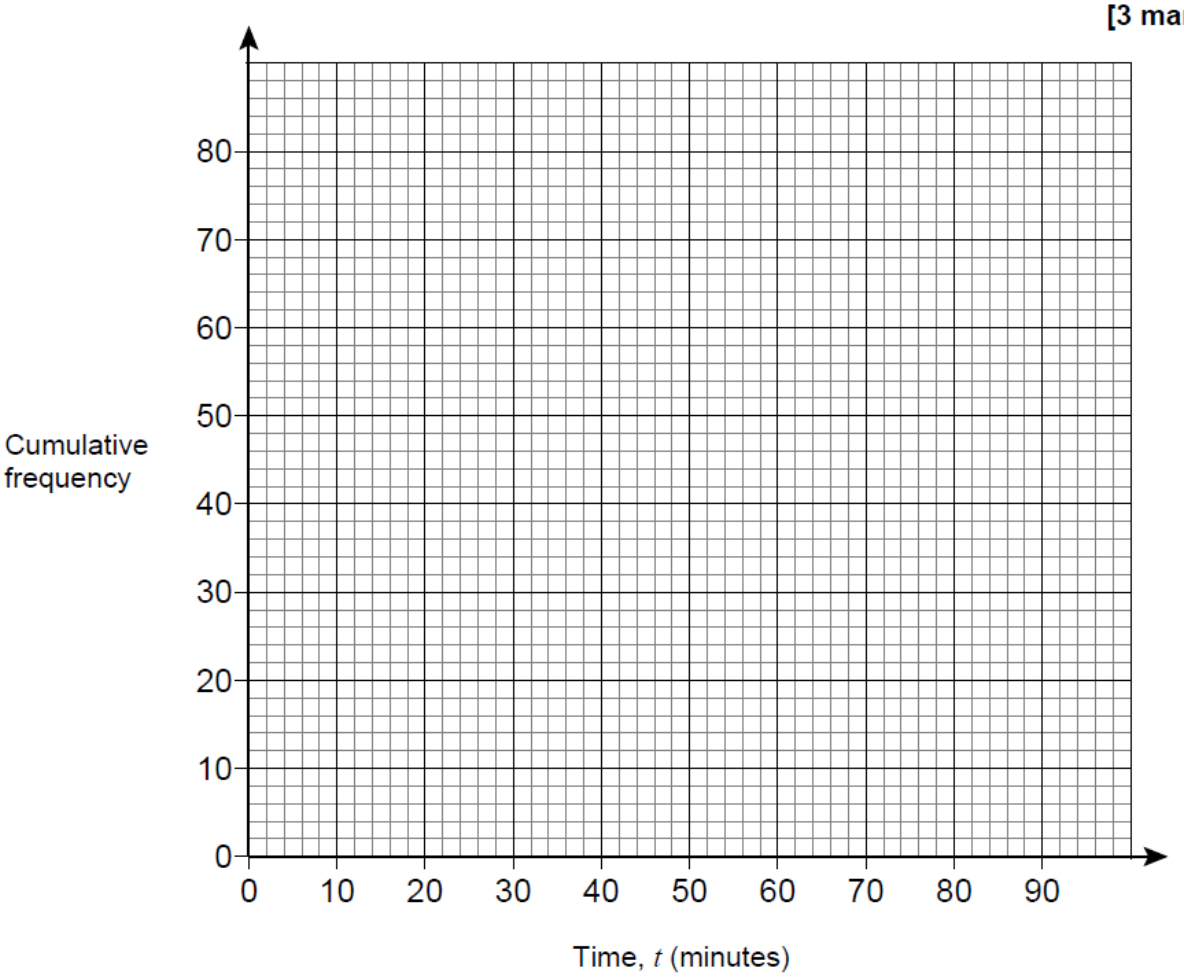
[3 marks]

Q	Answer	Mark	Comments
22	0.8×10 or 8 or 1.6×20 or 32 or 2.2×10 or 22 or 2×5 or 10	M1	Any one fd × class width
	$0.8 \times 10 + 1.6 \times 20 + 2.2 \times 10 + 2 \times 5$ or $8 + 32 + 22 + 10$	M1dep	oe
	72	A1	
	Additional Guidance		

Practice papers set 3, Paper 2, Higher Tier, Question 18(b)

18 (a) On the grid, draw a cumulative frequency graph.

[3 marks]



18 (b) Estimate the number of teachers who took between 50 minutes and 70 minutes to travel to work.

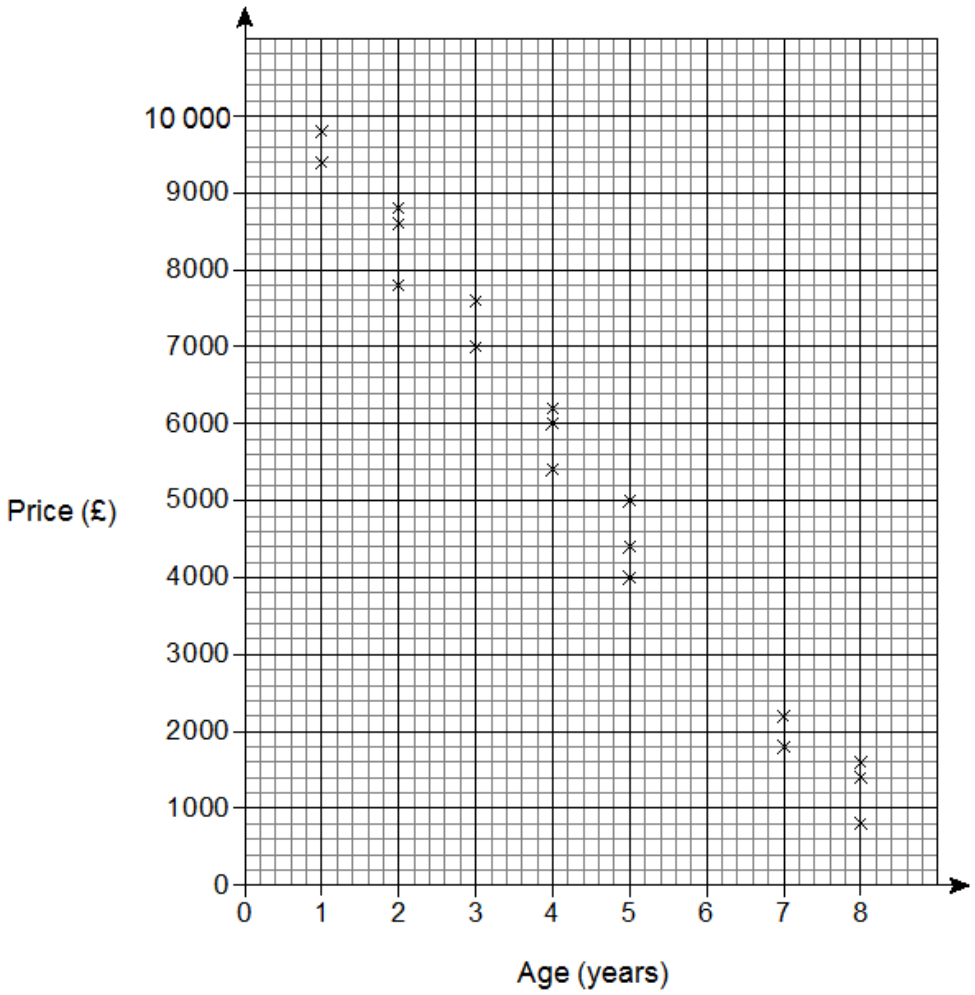
[2 marks]

Q	Answer	Mark	Comments
18(b)	**Alternative method 1**		
	56 or 72	M1	Reads off a cf value for 50 min or 70 min tolerance $\pm \frac{1}{2}$ square ft their cumulative frequencies and an increasing graph
	15 or 16 or 17	A1ft	ft their cumulative frequencies and an increasing graph
	Alternative method 2		
	$11 \times \frac{10}{30}$ or 3 or 4 or 3.66… or 3.67 or $25 \times \frac{10}{20}$ or 12 or 13 or 12.5	M1	oe
	15 or 16 or 17	A1	
	Additional Guidance		

Specimen papers, Paper 1, Higher Tier, Question 5

5 The scatter graph shows the age and the price of 18 cars.

The cars are all the same make and model.



Use a line of best fit to estimate the price of a 6-year old car.

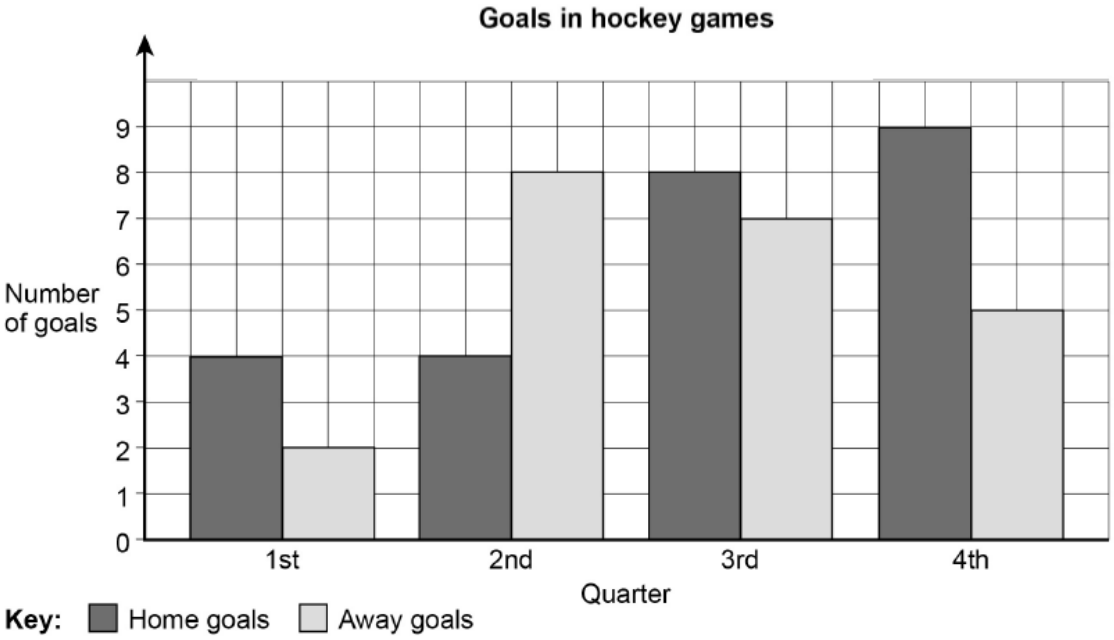
[2 marks]

Q	Answer	Mark	Comments
5	Straight ruled line of best fit	B1	Through (1, 9000) to (1, 10 000) and (8, 800) to (8, 1800)
	3400	B1ft	Reads correctly from their straight line of best fit with negative gradient Within $\frac{1}{2}$ square SC1 [3200, 3800] with no straight line of best fit drawn

June, Paper 3, Foundation Tier, Question 8

8 Here is information about the goals scored in some hockey games.

Each game has four quarters.



8 (a) Which quarter was the mode for **away** goals?

Circle your answer.

[1 mark]

1st 2nd 3rd 4th

8 (b) There were 10 games.

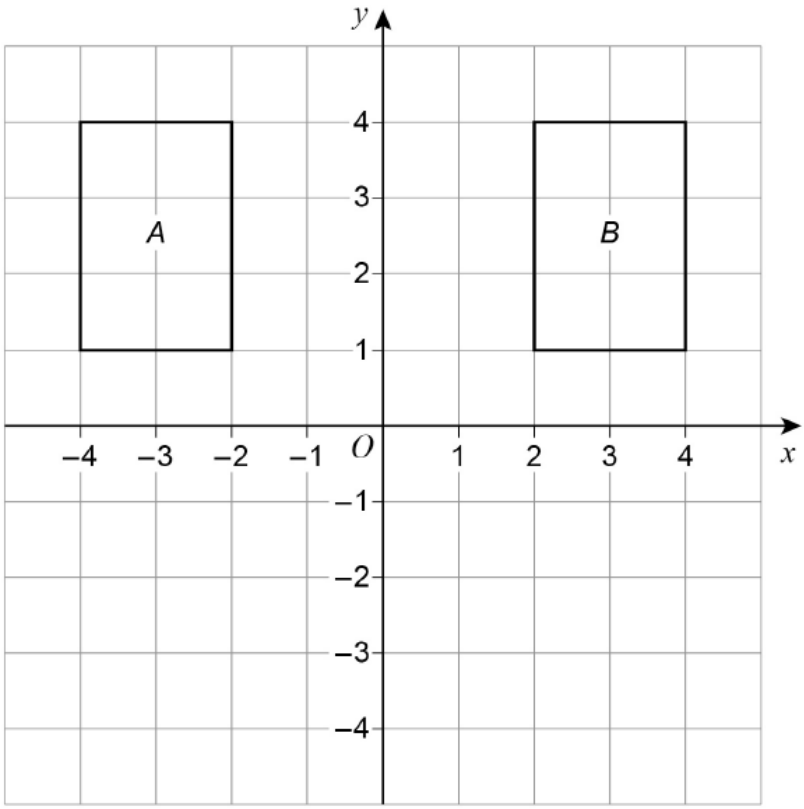
Work out the mean number of goals per game.

[2 marks]

Question	Answer	Mark	Comments
8(b)	(4 + 2 + 4 + 8 + 8 + 7 + 9 + 5) ÷ 10 or (6 + 12 + 15 + 14) ÷ 10 or (25 + 22) ÷ 10 or 2.5 + 2.2 or 47 ÷ 10	M1	Condone the omission of brackets Accept one error or omission in reading from diagram
	4.7	A1	oe
	Additional Guidance		
	5 on answer line with 4.7 in working		M1A1
	4 on answer line with 4.7 in working		M1A0
	(4 + 2 + 4 + 8 + 8 + 7 + 9) ÷ 10 is one omission (4 + 2 + 4 + 8 + 8 + 7 + 9 + 6) ÷ 10 is one error (6 + 12 + 15 + 13) ÷ 10 assume one error (25 + 23) ÷ 10 assume one error 2.5 + 2.3 assume one error		M1
	Do not accept further calculation after 4.7 seen 47 ÷ 10 = 4.7 4.7 × 4 = 18.8		M1A0
	Use of away goals only, treat as misread from the words in part (a) (2 + 8 + 7 + 5) ÷ 10 or 2.2 condone the omission of brackets		M1A0
	5 on answer line without working		M0A0
	(6 + 12 + 15) ÷ 10 assume two omissions		M0A0

June, Paper 1, Higher Tier, Question 21(a)

21 (a) The diagram shows rectangles A and B.



Rectangle A can be mapped to rectangle B by a **single** transformation.

Javed says,

"The **only** single transformation is a reflection in the y-axis because the rectangles are on opposite sides of the y-axis."

Is he correct?

Tick a box.

Yes ☐ No ☐

Give a reason for your answer.

[1 mark]

Question	Answer	Mark	Comments
21(a)	Ticks No and gives valid reason	B1	Examples of valid reasons: translation (by $\begin{pmatrix}6\\0\end{pmatrix}$) $\begin{pmatrix}6\\0\end{pmatrix}$ or $\begin{pmatrix}6\\0\end{pmatrix}$ or (6, 0) rotation (of 180°), (centre (0, 2.5)) enlargement (of scale factor) –1 (about (0, 2.5))

Additional Guidance	
Full descriptions are not needed, but if given must be correct For the enlargement, the scale factor of –1 must be given	
Transformation (6, 0)	B1
Moved 6 to the right	B1
Moved 6 squares	B0
Condone 'turn' with full description of 180°, (centre) (0, 2.5)	B1
2 or more single transformations given, with at least 1 correct	B1

November, Paper 2, Foundation Tier, Question 17(b)

17 Here is a formula to convert degrees Celsius (°C) to degrees Fahrenheit (°F).

$$F = 1.8C + 32$$

F is the number of degrees Fahrenheit

C is the number of degrees Celsius

17 (b) The temperature is –15°C

Nick says,

"Because the temperature is negative in Celsius, it **must** be negative in Fahrenheit."

Is he correct?

You **must** show your working.

[1 mark]

Question	Answer	Mark	Comments
17b	No and 5 or No and correctly evaluated counter example	B1	
	Additional Guidance		
	No, anything between –17°C and 0°C is positive in Fahrenheit	B1	
	No, anything between 0°F and 32°F is negative in Celsius	B1	
	Unless the range from –17°C to 0°C is given, then the counter example must be evaluated correctly		
	No because 1.8 × –15 is –27, and 32 – 27 = 4	B0	
	Any temperature in Celsius between $-17\frac{7}{9}$ °C and 0°C can be used as a counter-example eg1 1.8 × –10 + 32 = 14 so No eg2 1.8 × –1 + 32 = 30.2 so No	 B1 B1	
	No because 14°F is –10°C	B1	
	Accept No because –10 = 14	B1	
	No because –15 is positive in Fahrenheit	B0	

November, Paper 1, Higher Tier, Question 17

17 A and B are **similar** solids.

Solid	length (cm)
A	l
B	$2l$

Alex says,

"The volume of B is double the volume of A
because the length of B is double the length of A."

Is he correct?

Tick a box.

Yes ☐ No ☐

Give a reason for your answer.

[1 mark]

Question	Answer	Mark	Comments
17	Ticks No and gives correct reason or ticks No and gives numerical counter-example for any solid	B1	eg1 (volume of) A is 8 times bigger eg2 (volume) sf = 2^3 eg3 if A and B are cubes and l = 3, volume of A = 27 volume of B = 216 216 is not 27 × 2

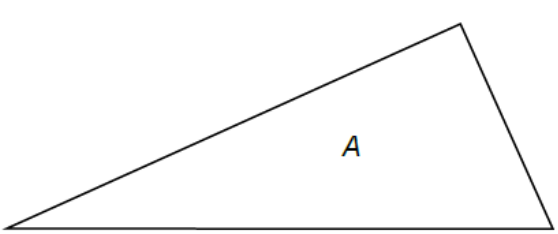
Additional Guidance	
Condone $8l^3$	B1
No, as the height/width is (also) doubled/different	B1
No, as the length/volume is cubed	B0
No, volume is l^3	B0
No, as the height could be different	B0
No, it would be 3 times as big	B0
Doubling the length doesn't double the volume	B0

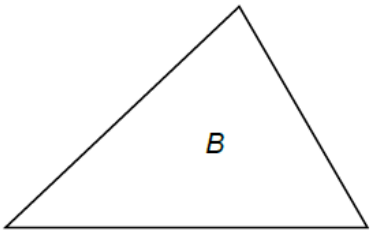
Practice papers set 3, Paper 2, Foundation Tier, Question 25

25 The angles in triangle *A* are in the ratio 1 : 2 : 3

The angles in triangle *B* are in the ratio 4 : 5 : 6

Not drawn accurately





Jack says,

"The middle number in each ratio is one third of the total, so one of the angles in each triangle is 60 degrees"

Is he correct?

Show working to support your answer.

[2 marks]

Q	Answer	Mark	Comments
25	**Alternative method 1**		
	States or implies that 2 is one third of 6 and States or implies that 5 is one third of 15 and $180 \div 3 = 60$ or $60 \times 3 = 180$ and Yes	B2	B1 for states or implies that 2 is one third of 6 or states or implies that 5 is one third of 15 or $180 \div 3 = 60$ or $60 \times 3 = 180$
	Alternative method 2		
	$180 \div (1 + 2 + 3) \times 2 = 60$ or $180 \div 6 \times 2 = 60$ and $180 \div (4 + 5 + 6) \times 5 = 60$ or $180 \div 15 \times 5 = 60$ and Yes	B2	B1 for $180 \div (1 + 2 + 3) \times 2 = 60$ or $180 \div 6 \times 2 = 60$ or $180 \div (4 + 5 + 6) \times 5 = 60$ or $180 \div 15 \times 5 = 60$
	Alternative method 3		
	30° and 60° and 90° and 48° and 60° and 72° and Yes		B1 for 30° and 60° and 90° or 48° and 60° and 72°
	Additional Guidance		

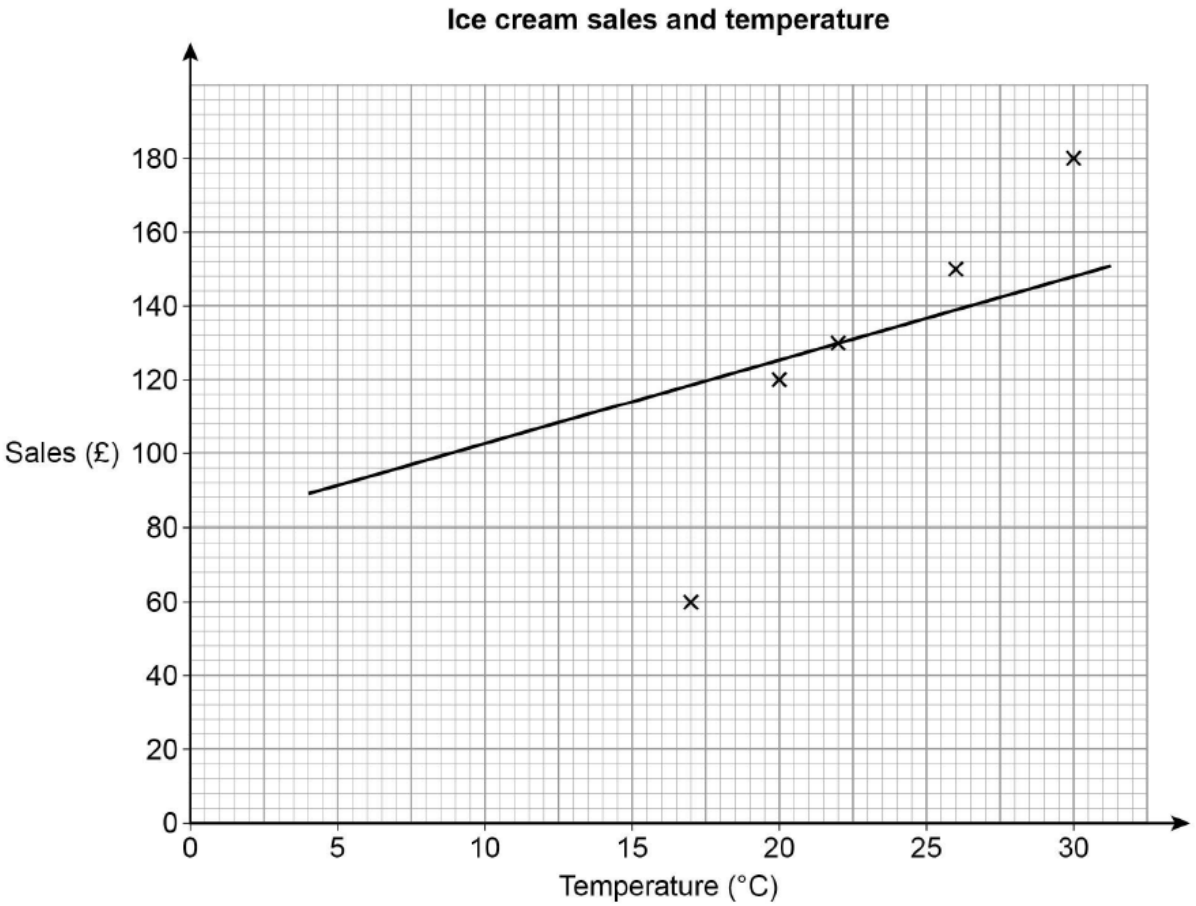
June, Paper 2, Foundation Tier, Question 12(a)

12 Lee sells ice creams.

The table shows the midday temperature and his sales for five days.

	Day 1	Day 2	Day 3	Day 4	Day 5
Temperature (°C)	30	26	17	22	20
Sales (£)	180	150	80	130	120

12 (a) He draws this scatter graph and line of best fit.



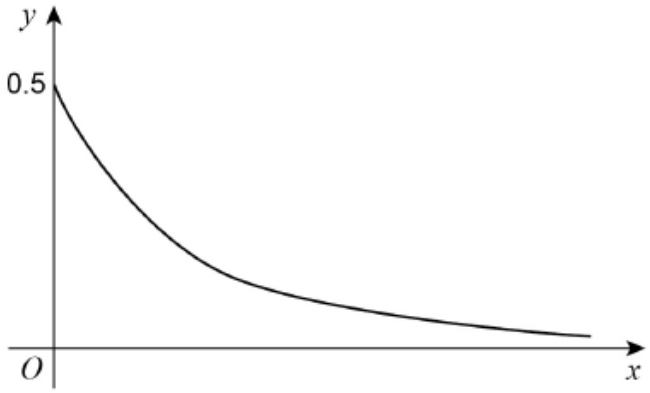
Write down **two** mistakes he has made.

[2 marks]

Question	Answer	Mark	Comments
12(a)	Correct criticisms about any two of the incorrect plotting of (17, 80) at (17,60) the incorrect position of the line of best fit the incorrect length of the line of best fit (outside the range of the data)	B2	B1 for one correct comment about point, position or length Allow reference to a better line of best fit drawn eg The line should look like mine
	Additional Guidance		
	A comment about the incorrect point must refer to the specific point		
	One of the points is wrong and point at (17, 60) circled on graph	B1	
	Not plotted (17, 80) correctly	B1	
	x on 60 should be on 80	B1	
	Point at 60 is wrong	B1	
	Day 3 is wrong/ there is no day 3 on the graph	B1	
	17 is plotted at 60/ 17 should be plotted at 80	B1	
	One of the points is wrong	B0	
	Points on the graph don't match the table	B0	
	Not put all the points in the correct place	B0	
	A comment about the line of best fit must not have any misconception		
	The line is not steep enough/ at wrong angle/ should be more vertical	B1	
	The line isn't a line of best fit/ the line doesn't fit the points	B1	
	The line of best fit goes below 17/ condone past 30 (implies outside range)	B1	
	The line of best fit is wrong/ not drawn accurately/ not drawn properly	B0	
	It isn't a line of best fit because it doesn't start at 0	B0	
	The line of best fit is wrong it should go through (0, 0)	B0	
	The line of best fit doesn't go through the points	B0	
	The line is wrong it only goes through one cross	B0	
	The line of best fit doesn't go to the axis (implies it's too short)	B0	

June, Paper 3, Higher Tier, Question 18

18 Nick sketches the graph of $y = 0.5^x$ for $x \geqslant 0$



Make **one** criticism of his sketch.

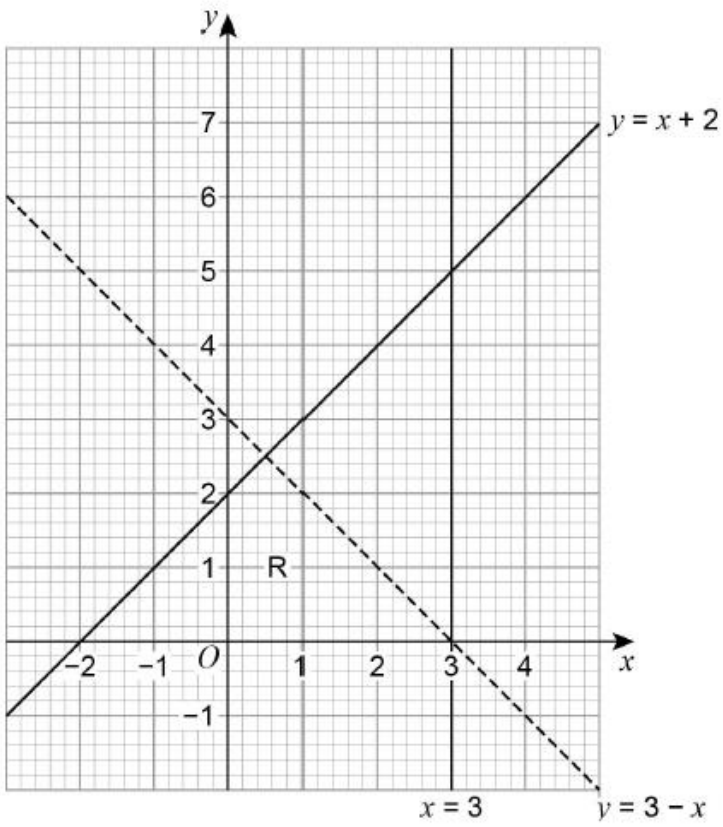
[1 mark]

Question	Answer	Mark	Comments
18	Valid criticism	B1	eg (y =) 0.5 should be (y =) 1 y = 0.5 should be when x = 1 When x = 0 y = 1 0.5 is incorrect Crosses y axis in wrong place Graph should start at 1 $0.5^0 = 1$
	Additional Guidance		
	Do not accept statements which are contradictory		
	He does not have a scale on the x axis		B0
	It does not pass through zero		B0
	The line should meet the x axis		B0

November, Paper 3, Higher Tier, Question 23

23 Joe draws this graph to identify the region R represented by

$y \leqslant x + 2$ and $y > 3 - x$ and $x < 3$



Make **two** criticisms of his graph.

[2 marks]

Question	Answer	Mark	Comments
23	Line $x = 3$ should be dashed or not included	B1	oe eg vertical line should be dotted
	R is in the wrong place	B1	oe eg region is not correct May be shown on diagram
	Additional Guidance		
	x is not equal to 3		B1
	R does not include $x = 3$		B1
	Straight line should be less than 3		B1
	$x = 3$ is not in the region		B1
	Line at $x = 3$ is closed not open		B1
	Lines are not drawn correctly (not enough)		B0
	Should have shaded above the dotted line ($y > 3 - x$)		B1
	R should be where (2, 2) is		B1
	R should be shaded		B0

Practice papers set 3, Paper 3, Foundation Tier, Question 15

15 In a game, Anna has to describe a hexagonal prism.

She must **not** use the words 'hexagonal' or 'prism'.

She says,

"It has a uniform cross section.

It has 6 faces.

It has 12 vertices.

It has 12 edges."

Correct any mistakes Anna has made.

[2 marks]

Q	Answer	Mark	Comments
15	(It should be) 8 faces	B1	oe
	(It should be) 18 edges	B1	oe
	Additional Guidance		

June, Paper 3, Foundation Tier, Question 21

21 Purple paint is made by mixing red paint and blue paint in the ratio 5 : 2

Yan has 30 litres of red paint and 9 litres of blue paint.

What is the **maximum** amount of purple paint he can make?

[3 marks]

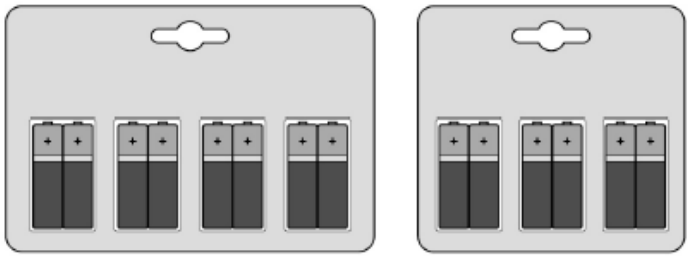
Question	Answer	Mark	Comments
21	**Alternative method 1**		
	Any correct scaling of the ratio 5 : 2 eg 10 (:) 4 or 20 (:) 8 or 25 (:) 10	M1	oe
	22.5 (:) 9 or 22.5 (red) or 30 (:) 12 or 12 (blue)	M1dep	oe
	31.5 or $31\frac{1}{2}$ or $\frac{63}{2}$	A1	
	Alternative method 2		
	9 ÷ 2 or 4.5 or 30 ÷ 5 or 6	M1	oe 2 ÷ 9 or 0.22… 5 ÷ 30 or 0.16… or 0.17
	5 × their 4.5 or 22.5 or 7 × their 4.5 or 2 × their 6 or 12 or 7 × their 6 or 42	M1dep	oe
	31.5 or $31\frac{1}{2}$ or $\frac{63}{2}$	A1	
	Alternative method 3		
	$\frac{2}{7}$ × purple = blue $\frac{5}{7}$ × purple = red	M1	oe $\frac{2}{7}$ × purple = 9 $\frac{5}{7}$ × purple = 30
	$9 \times \frac{7}{2}$ or $30 \times \frac{7}{5}$ or 42	M1dep	oe
	31.5 or $31\frac{1}{2}$ or $\frac{63}{2}$	A1	

Additional Guidance continues on the next page

	Additional Guidance	
21 cont	28 + 3.5 = 31.5	M1M1A1
	28 + 3.5	M1M1A0
	31.5, answer 31	M1M1A1
	31.5 + 42 = 73.5	M1M1A0
	10 4	M1M0A0
	10, 4	M1M0A0
	10 + 4	M1M0A0
	'He has 2.5 times more red than blue'	M1M0A0
	2.5 : 1	M1M0A0
	2.5	M0M0A0
	28 on its own	M0M0A0

June, Paper 3, Foundation Tier, Question 18

18 A shop sells two brands of battery.



Brand A
Pack of 8
Price £3.60

Brand B
Pack of 6
Price £2.94

One brand A battery powers a toy for 5 hours.

One brand B battery powers the same toy for $5\frac{1}{2}$ hours.

Which brand is better value?

You **must** show your working.

[5 marks]

Question	Answer	Mark	Comments
18	**Alternative method 1 of 6 – cost per hour**		
	3.6(0) ÷ 8 or (0).45 or 2.94 ÷ 6 or (0).49	M1	360 ÷ 8 or 45 or 294 ÷ 6 or 49
	their (0).45 ÷ 5 or (0).09 or their (0).49 ÷ 5.5 or (0).08(9…)	M1dep	their 45 ÷ 5 or 9 or their 49 ÷ 5.5 or 8.(9…)
	their (0).45 ÷ 5 **and** their (0).49 ÷ 5.5	M1dep	their 45 ÷ 5 **and** their 49 ÷ 5.5
	(£)0.09 and (£)0.08(9…)	A1	9(p) and 8.(9…) (p)
	brand B	A1ft	ft correct decision for their values with M3 scored
	Alternative method 2 of 6 – cost per hour from price of pack		
	8 × 5 or 40 or 6 × 5.5 or 33	M1	
	3.6(0) ÷ their 40 or (0).09 or 2.94 ÷ their 33 or (0).08(9…)	M1dep	360 ÷ their 40 or 9 or 294 ÷ their 33 or 8.(9…)
	3.6(0) ÷ their 40 **and** 2.94 ÷ their 33	M1dep	360 ÷ their 40 **and** 294 ÷ their 33
	(£)0.09 and (£)0.08(9…)	A1	9(p) and 8.(9…) (p)
	brand B	A1ft	ft correct decision for their values with M3 scored

Alternative method 3 continues on the next page

Question	Answer	Mark	Comments
18 cont	**Alternative method 3 of 6 – number of hours per unit cost from number of batteries**		
	3.6(0) ÷ 8 or (0).45 or 2.94 ÷ 6 or (0).49	M1	360 ÷ 8 or 45 or 294 ÷ 6 or 49
	5 ÷ their (0).45 or 11.1(…) or 5.5 ÷ their (0).49 or 11.2(…)	M1dep	5 ÷ their 45 or (0).111(…) or 5.5 ÷ their 49 or (0).112(…)
	5 ÷ their (0).45 **and** 5.5 ÷ their (0).49	M1dep	5 ÷ their 45 **and** 5.5 ÷ their 49
	11.1(…) (hours) and 11.2(…) (hours)	A1	(0).111(…) (hours) and (0).112(…) (hours)
	brand B	A1ft	ft correct decision for their values with M3 scored
	Alternative method 4 of 6 - common number of batteries		
	Scaling towards a cost for a common number of batteries (eg 24 batteries) eg 8 × 3 × 5 or 120 **and** 6 × 4 × 5.5 or 132	M1	
	eg 3 × 3.60 or 10.8(0) **and** 4 × 2.94 or 11.76	M1	eg 3 × 360 or 1080 and 4 × 294 or 1176
	eg their 10.8(0) ÷ their 120 or (0).09 **and** their 11.76 ÷ their 132 or (0).08(9…)	M1dep	eg their 1080 ÷ their 120 or 9 **and** their 1176 ÷ their 132 or 8.(9…) dependent on M1M1
	(£)0.09 and (£)0.08(9…)	A1	9(p) and 8.(9…) (p)
	brand B	A1ft	ft correct decision for their values with M3 scored

Alternative method 5 continues on the next page

Question	Answer	Mark	Comments
18 cont	**Alternative method 5 of 6 – number of hours per unit cost from batteries per unit cost**		
	8 ÷ 3.6(0) or 2.2(…) or 6 ÷ 2.94 or 2.04(…)	M1	8 ÷ 360 or 0.022(…) or 6 ÷ 294 or 0.0204(…)
	their 2.2(…) × 5 or 11.1(…) or their 2.04(…) × 5.5 or 11.2(…)	M1dep	their 0.022(…) × 5 or 0.111(…) or their 0.0204(…) × 5.5 or 0.112(…)
	their 2.2(…) × 5 **and** their 2.04(…) × 5.5	M1dep	their 0.022(…) × 5 **and** their 0.0204(…) × 5.5
	11.1(…) (hours) and 11.2(…) (hours)	A1	(0).111(…) (hours) and (0).112(…) (hours)
	brand B	A1ft	ft correct decision for their values with M3 scored
	Alternative method 6 of 6 – cost for common number of battery hours		
	3.6(0) ÷ 8 or (0).45 or 2.94 ÷ 6 or (0).49	M1	360 ÷ 8 or 45 or 294 ÷ 6 or 49
	Scaling towards a common number of battery hours (eg 55 hours) eg their (0).45 × 11 or their (0).49 × 10	M1dep	eg their 45 × 11 or their 49 × 10
	eg their (0).45 × 11 **and** their (0).49 × 10	M1dep	eg their 45 × 11 **and** their 49 × 10
	eg (£)4.95 and (£)4.9(0)	A1	eg 495(p) and 490(p)
	brand B	A1ft	ft correct decision for their values with M3 scored

Additional Guidance continues on the next page

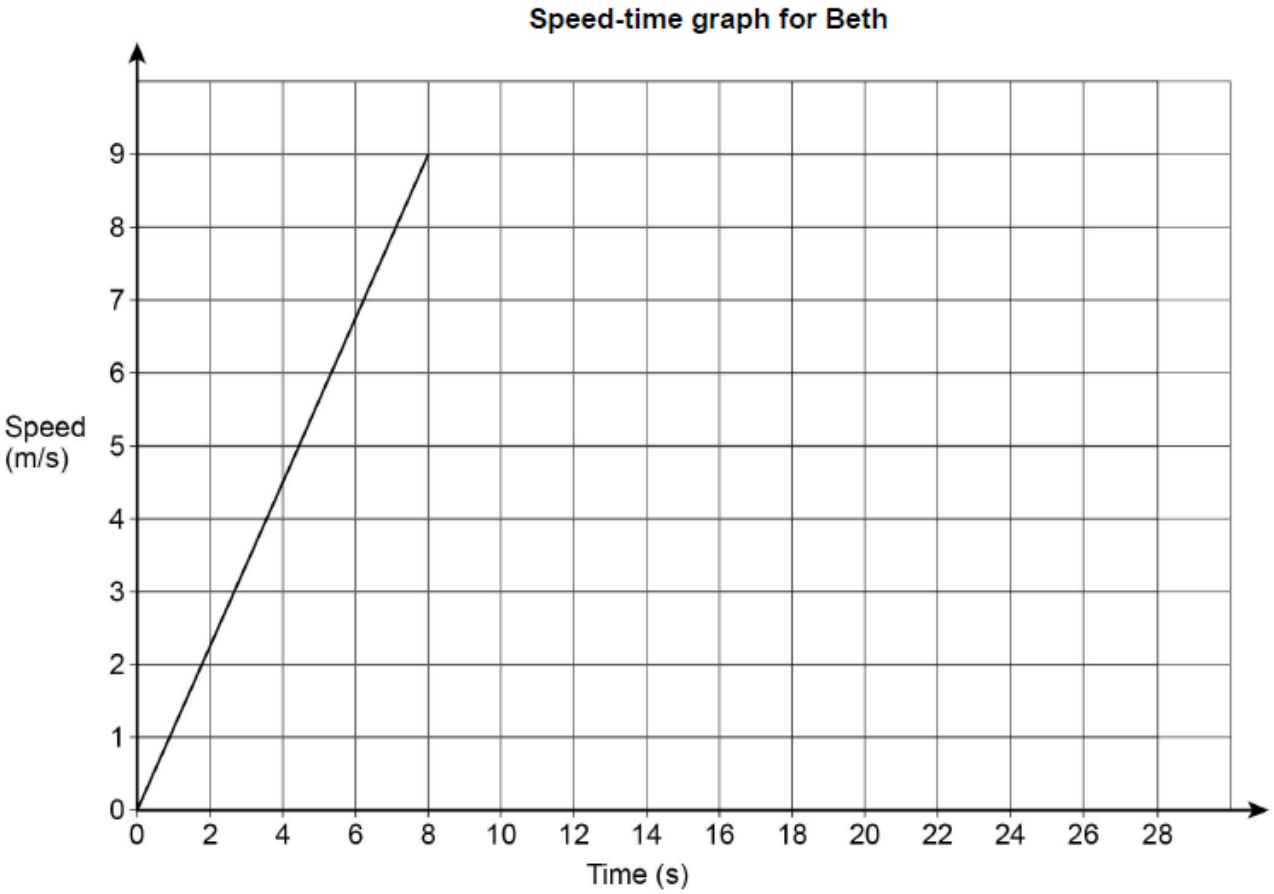
18 cont	**Additional Guidance**	
	For the first A mark the values must not be rounded to the same value	
	A1ft can be awarded after A0 for the same value for the correct decision eg 0.09 and 0.09 with decision 'both the same'	M3A0A1ft
	8 × 5 = 40 and 40 ÷ 3.6(0) **and** 6 × 5.5 = 33 and 33 ÷ 2.94 is equivalent to 8 ÷ 3.6(0) × 5 **and** 6 ÷ 2.94 × 5.5 on Alt 5	M3
	8 × 5 = 40 and 40 ÷ 3.6(0) is equivalent to 8 ÷ 3.6(0) × 5 on Alt method 5	M2
	6 × 5.5 = 33 and 33 ÷ 2.94 is equivalent to 6 ÷ 2.94 × 5.5 on Alt method 5	M2
	(0).45 ÷ 5	M1M1
	(0).45 ÷ 5 and (0).49 ÷ 5.5	M1M1M1
	(0).45 ÷ 5 and (0).415 ÷ 5.5 0.415 is not from a correct method	M1M1M0
	In Alt method 4 M1M1 can be awarded in either order	
	In Alt method 5 their 2.2(…) must be correct or from correct method their 2.04(…) must be correct or from correct method	
	Accept misread of 4 batteries (A) or 3 batteries (B) for up to M3A0A1ft	
	Accept working with minutes eg in Alt method 3 for 2nd M1dep accept 300 ÷ 45 = 6.6(…) or 6.7 or 330 ÷ 49 = 6.7(…) for 3rd M1dep accept 300 ÷ 45 **and** 330 ÷ 49 for first A mark must see 6.6(…) or 6.67 **and** 6.7(…) or 6.7 **and** 6.73(…)	

November, Paper 2, Higher Tier, Question 24

24 Beth ran a 200 metre race.

Here is a graph of the first 8 seconds of her race.

She completed the race at a constant speed of 9 m/s



Amy completed the race in 27 seconds.

Did Beth finish before Amy?

You **must** show your working.

[3 marks]

Question	Answer	Mark	Comments
24	**Alternative method 1**		
	$0.5 \times 8 \times 9$ or 36 or $(27 - 8) \times 9$ or 19×9 or 171	M1	May be seen on graph
	$0.5 \times 8 \times 9 + (27 - 8) \times 9$ or 207	M1dep	M2 $0.5 \times (27 + 19) \times 9$
	207 and Yes	A1	
	Alternative method 2		
	$0.5 \times 8 \times 9$ or 36	M1	May be seen on graph
	$\frac{200 - \text{their } 36}{9}$ or $\frac{164}{9}$ or 18.2...	M1dep	
	26.2... and Yes or 18.2... and 19 and Yes	A1	
	Alternative method 3		
	$0.5 \times 8 \times 9$ or 36	M1	May be seen on graph
	$\frac{200 - \text{their } 36}{27 - 8}$ or $\frac{164}{19}$ or 8.6...	M1dep	
	8.6... and Yes	A1	
	Alternative method 4		
	$0.5 \times 8 \times 9$ or 36	M1	May be seen on graph
	Attempt at total distance for Beth for $26.\dot{2} \leqslant$ total time < 27	M1dep	eg (time 26.5s) $0.5 \times 8 \times 9 + (26.5 - 8) \times 9$
	Correct total distance for Beth for $26.\dot{2} \leqslant$ total time < 27 and Yes	A1	eg (time 26.5s) 202.5 and Yes
	Additional Guidance		

Practice papers set 3, Paper 2, Foundation Tier, Question 16(a)

16 The speed of the International Space Station is 27 576 kilometres per hour.

16 (a) The station travels 42 600 kilometres in one orbit.

Work out the number of **full** orbits the station does in one day.

[3 marks]

Q	Answer	Mark	Comments
16(a)	**Alternative method 1**		
	27 576 × 24 or 661 824	M1	
	their 661 824 ÷ 42 600 or 15.5…	M1	
	15	A1	
	Alternative method 2		
	42 600 ÷ 27 576 or 1.54…	M1	
	24 ÷ their 1.54… or 15.5…	M1	
	15	A1	
	Alternative method 3		
	27 576 ÷ 42 600 or 0.647…	M1	
	their 0.647 × 24 or 15.5…	M1	
	15	A1	
	Additional Guidance		

Practice papers set 3, Paper 2, Higher Tier, Question 6(b)/ Foundation Tier, Question 22(b)

6 Dev invests £1500 for 2 years.

The compound interest rate is 1.6% per year.

6 (b) Emma invests £1500 for 2 years.

The interest rate is

1.8% for the first year

1.3% for the second year.

Whose investment is worth more after 2 years?

You **must** show your working.

[4 marks]

Q	Answer	Mark	Comments
6(b)	**Alternative method 1**		
	[1548.38, 1548.39]	B1ft	ft their part (a)
	1500 × 1.018 or 1527	M1	oe
	1500 × 1.018 × 1.013 or 1527 × 1.013 or [1546.85, 1546.86]	M1dep	oe
	[1548.38, 1548.39] and [1546.85, 1546.86] and Dev's	A1ft	oe ft their part (a)
	Alternative method 2		
	1.016^2 or 1.032(256) or 1.0323	M1	
	1.018 or 1.013 seen	M1	
	1.018 × 1.013 or 1.031(234)	M1dep	
	1.032(256) and 1.031 and Dev's	A1	
	Additional Guidance		
	Note incorrect answers from part (a) for Alt 1 £1500 × 1.6 × 2 = £4800 £1500 × 1.6^2 = £3840 £1500 × 1.016 × 2 = £3048		

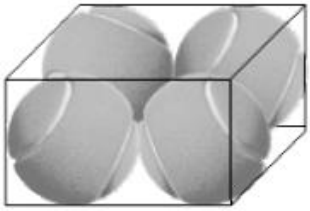
Practice papers set 3, Paper 2, Higher Tier, Question 17

17 Here are two closed containers.

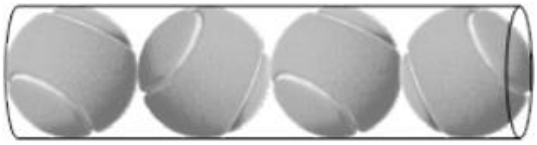
Four tennis balls just fit in each container.

Each tennis ball has diameter 64 mm

Cuboid



Cylinder



Which container has the smaller surface area?

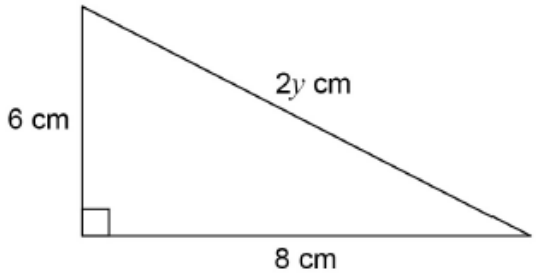
You **must** show your working.

[5 marks]

Q	Answer	Mark	Comments
17	128×128 ($\times 2$) or 16 384 or 32 768 or 128×64 ($\times 4$) or 8192 or 32 768	M1	Any one surface area of cuboid May be implied
	$128 \times 128 \times 2 + 128 \times 64 \times 4$ or $16\,384 \times 2 + 8192 \times 4$ or $32\,768 + 32\,768$ or 65 536	M1dep	Total surface area of cuboid
	$\pi \times 32^2$ ($\times 2$) or 1024π or 2048π or [3215, 3217.41] or [6430.7, 6434.82] or $2 \times \pi \times 32 \times 256$ or $16\,384\pi$ or [51 445.76, 51 478.53]	M1	Any one surface area of cylinder May be implied
	$18\,432\pi$ or [57 876, 57 913.344]	A1	Total surface area of cylinder
	65 536 and [57 876, 57 913.344] and cylinder	A1ft	ft M2 with at least one correct total surface area with correct conclusion
	Additional Guidance		
	Cylinder by [7622.656, 7660]		M1M1M1A1A1
	Cylinder with no other working		0

June, Paper 2, Higher Tier, Question 15(a)

15 Sami is trying to work out the exact value of y using Pythagoras' theorem.



Not drawn accurately

Here is her working.

$$(2y)^2 = 6^2 + 8^2$$

$$2y^2 = 36 + 64$$

$$2y^2 = 100$$

$$y^2 = 100 \div 2$$

$$y^2 = 50$$

$$y = \sqrt{50}$$

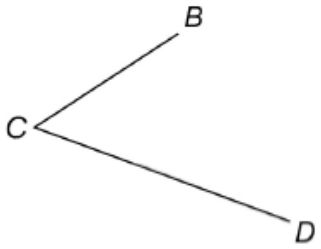
15 (a) What error has she made in her working?

[1 mark]

Question	Answer	Mark	Comments
15(a)	Identifies error in working	B1	eg $2y^2$ should be $4y^2$ 2 should be 4 2 should be squared Should have worked out $(2y)^2$ but has only worked out y^2
	Additional Guidance		
	Answer may be seen next to Sami's method below the diagram		
	Adding brackets around $2y$ to Sami's working in line 2 (working lines may be blank)		B1
	Showing the error being corrected eg1 $(2y)^2 = 100$ and $2y = 10$ eg2 $4y^2 = 36 + 64$		B1 B1
	She hasn't squared the bracket		B1
	Has only squared y		B1
	The brackets have been left out		B1
	$(2y)^2$ is not equal to $2y^2$		B1
	Should have square rooted 100 before dividing by 2 because the $2y$ should not have been taken out of the bracket		B1
	Should have square rooted 100 before dividing by 2 (could be referring to working from line 3 to line 4)		B0
	Line 2 is wrong (has not identified which part of line 2 is wrong)		B0
	Answer should be $y = 5$ (has not shown what the error is)		B0
	Ignore non-contradictory work if correct response seen		

November, Paper 1, Foundation Tier, Question 21(a)

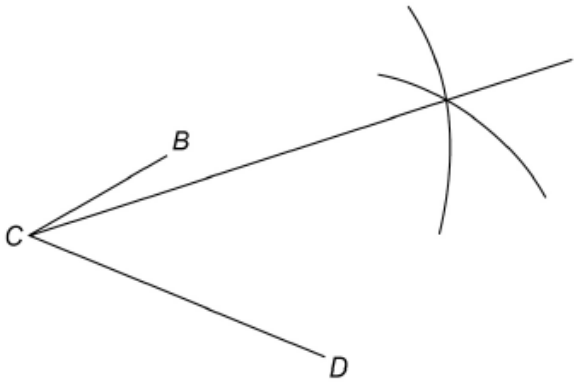
21 (a) Joe wants to bisect angle *BCD*.



Here is his method.

Use a pair of compasses to draw arcs of the same radius from *B* and *D*.

Draw a straight line from *C* through the intersection of the arcs.



Write down the error in his method.

[1 mark]

Question	Answer	Mark	Comments
21a	The arcs should be drawn from *C* or from points the same distance from *C* or The lines are different lengths, so you can't go from the ends	B1	oe
	Additional Guidance		
	CB ≠ CD		B1
	Not drawn an arc from C		B1
	He put compass in wrong place. He should have started at C but he started at B and D		B1
	Should be an arc on each line CB and CD		B0
	Arcs in wrong place		B0
	Arcs aren't equal		B0
	His line isn't in the centre of B and D		B0
	D has a longer line than B		B0
	Arcs aren't the same radius		B0
	Should be an arc from B to D		B0
	Should be an arc from B to the line CD		B0
	Should be an intersection on CB and CD		B0

November, Paper 2, Higher Tier, Question 21(b)

21 (b) Levi is solving $2x^2 + 5x = 0$

He uses this method.

$2x^2 + 5x = 0$ subtract $5x$ from both sides

$2x^2 = -5x$ divide both sides by x

$2x = -5$ divide both sides by 2

$x = -2.5$

Evaluate his method and his answer.

[2 marks]

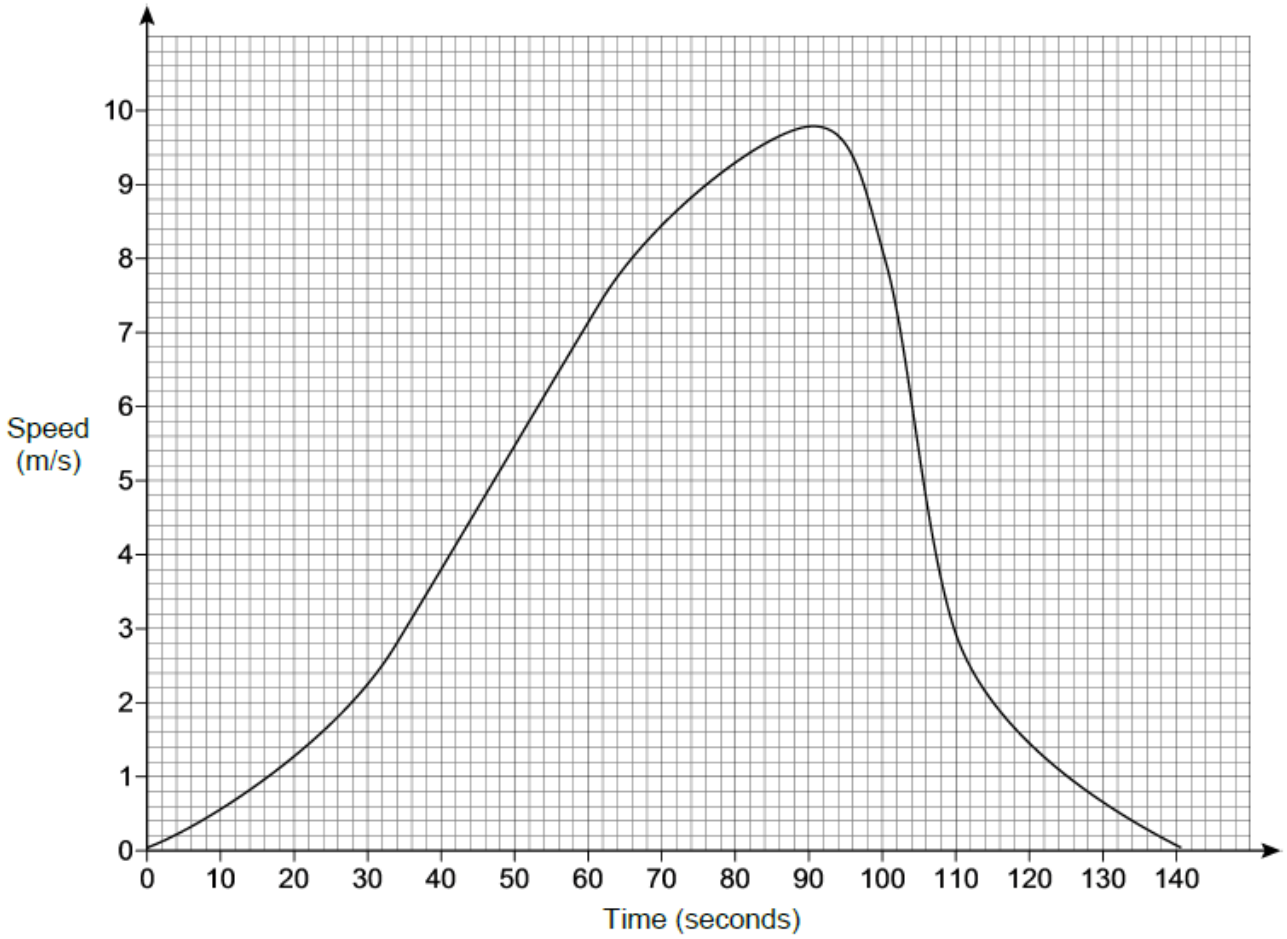
Question	Answer	Mark	Comments
21(b)	Full evaluation of method and answer	B2	eg1 Cannot divide by x as it could be zero eg2 Should have factorised and then he would have also found that $x = 0$ eg3 Should have used the formula and then he would have also found that $x = 0$ eg4 Should have used a graphical method then he would have also found that $x = 0$ eg5 Should have completed the square then he would have also found that $x = 0$ B1 Partial evaluation eg1 $x = 0$ has been omitted eg2 Should have factorised eg3 Should have used the formula eg4 Should have drawn a graph eg5 Only found one solution eg6 Cannot divide by zero

Additional Guidance	
For B2 there needs to be an evaluation of the method and an indication that $x = 0$ has been omitted from the answer	
$x(2x + 5) = 0$ $x = 0$ and $x = –2.5$	B2
Should be two solutions	B1
What about $x = 0$	B1
The answer is wrong	B0
Ignore non-contradictory further work	

Practice papers set 3, Paper 2, Higher Tier, Question 21(a)

21 The graph shows the speed of a skier.

Nick wants to estimate the distance travelled by the skier in 140 seconds.



21 (a) He works out the area of the triangle with vertices (0, 0), (140, 0) and (90, 9.8)

Does Nick's method give a good estimate?

Tick a box.

Yes ☐ No ☐

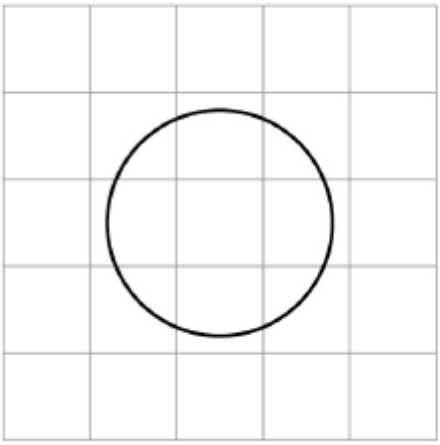
Give a reason for your answer.

[2 marks]

Q	Answer	Mark	Comments
21(a)	Yes and full explanation involving areas eg Yes, the extra areas are (about) the same as the areas that are left out	B2	B1 for partial explanation eg Some parts are included that shouldn't be and some parts are left out B2 or B1 may be awarded from working on the diagram
	Additional Guidance		

June, Paper 3, Foundation Tier, Question 13(b)

13 A circle is drawn on a centimetre grid.



13 (b) Grace works out that the area of the circle is more than 9 cm^2

Why must this be wrong?

[1 mark]

Question	Answer	Mark	Comments
13(b)	Valid reason for the area of the circle or the square around the circle	B1	
	Additional Guidance		
	The area of the circle stated to be [4.5, 6.2] without incorrect working	B1	
	Area of circle of radius 1.5 (cm) is 7(.06…) or 7.07 or 7.1	B1	
	The square around it is only 9 cm^2 or 9 squares or 3 × 3 square	B1	
	There aren't 9 squares in the circle	B1	
	The circle fits into a 9 cm^2 square or 9 squares or 3 × 3 square	B1	
	It only covers about [4.5, 6.2] squares	B1	
	Circle does not (completely) cover nine separate boxes	B1	
	There is one whole square and 8 part squares in the circle	B1	
	Because all of the space for 9 is not used up	B1	
	Calculate radius = 1.6(9…) (cm) or 1.7 (cm) from area of circle 9 (cm^2) and states radius of circle drawn is smaller	B1	
	She uses 9 squares that are half in and half out of the circle, she needed to work it out only using the squares inside the circle	B0	
	Does not fill up the whole square (no reference to 9)	B0	
	Because the radius is not big enough for it to be 9	B0	

June, Paper 2, Foundation Tier, Question 21(b)

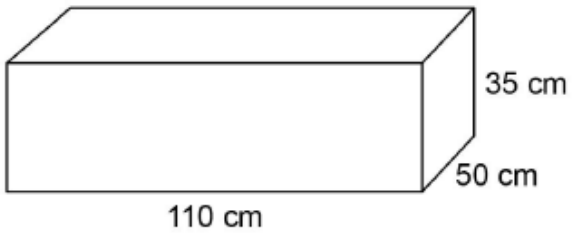
21 Eva thinks she can save water by having a shower instead of a bath.

Eva's shower

uses 10.8 litres per minute

lasts for 8 minutes.

Eva assumes that the water in her bath is in the shape of this cuboid.

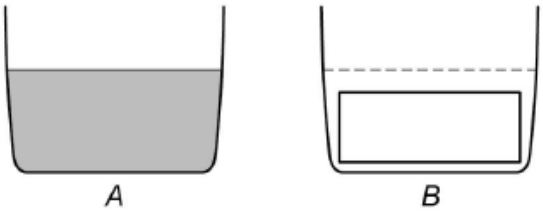


1000 cm^3 = 1 litre

21 (b) *A* shows the water level before Eva gets into the bath.

B shows the cuboid in the empty bath.

Not drawn accurately



What does this tell you about the amount of water saved?

[1 mark]

Question	Answer	Mark	Comments
21(b)	A comment that the answer to part (a) was too low or that the amount saved would be greater	B1	
	Additional Guidance		
	It was more	B1	
	More water saved	B1	
	She underestimated it	B1	
	She underestimated the water saved	B1	
	She's saving more water because she's using more water than the cuboid	B1	
	Greater than 106.1 litres (may need to check value in part (a) if they quote a different value)	B1	
	More than Eva's assumption	B1	
	Eva's assumption was not accurate therefore the prediction was wrong	B0	
	She underestimated the water	B0	
	Less water used	B0	
	It was inaccurate	B0	
	A uses more water than B (only talking about the diagram)	B0	
	B saves more than A (only talking about the diagram)	B0	
	Saves a lot of water	B0	
	More water used	B0	
	Cuboid smaller than bath	B0	
	Used more water in the bath than she thought	B0	

November, Paper 2, Foundation Tier, Question 13(b)

13 (a) Use your calculator to work out the exact value of $\frac{18\ 953 \times 437}{11}$

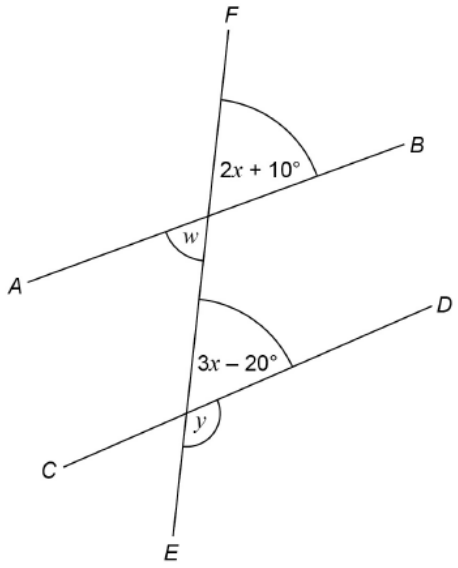
13 (b) Use approximations to 1 significant figure to check if your answer to part (a) is sensible.

[3 marks]

Question	Answer	Mark	Comments
13b	20 000 and 400 and 10 and 800 000 and Yes	B3ft	ft correct decision for their answer to (a) oe decision eg it is sensible B2 20 000 and 400 and 10 B1 20 000 or 400 or 10
	Additional Guidance		
	800 000 (and Yes) with no other values		B0
	If answer to (a) is 800 000 to 1sf then the correct ft decision in (b) is Yes eg1 (a) 770 000 (b) decision should be Yes eg2 (a) 1762 (b) decision should be No eg3 (a) 752.951 (b) allow decision to be Yes or No		

June, Paper 3, Foundation Tier, Question 24(b)

24 *AB*, *CD* and *EF* are straight lines.



Not drawn accurately

24 (a) Ava assumes that *AB* and *CD* are parallel.

What answer should she get for the size of angle y?

[4 marks]

24 (b) In fact,

AB and *CD* are **not** parallel

angle w is 60°

What effect does this have on the size of angle y?

Tick a box.

☐ y is bigger

☐ y is the same

☐ y is smaller

Show working to support your answer.

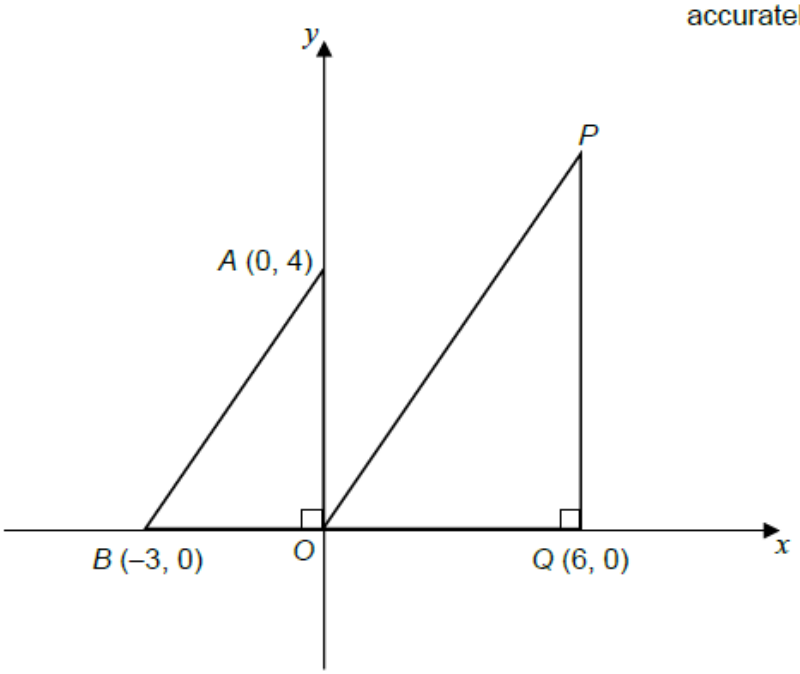
[3 marks]

Question	Answer	Mark	Comments
24(b)	$2x + 10 = 60$ or $2x = 60 - 10$ or $2x = 50$ or $x = 25$	M1	
	3 × their 25 – 20 or 55 or 180 – 55 or 125	M1dep	oe
	(y =) 125 and bigger or (y is) 15 bigger	A1ft	oe ft their (a)
	Additional Guidance		
	Note: A complete logical explanation of the effect of lines not being parallel eg w is smaller so $2x + 10$ is smaller so x is smaller so $3x - 20$ is smaller so y is bigger		M1M1A1
	2 × 25 + 10 = 60		M1M0A0
	y is bigger ticked but no valid working		M0M0A0

Practice papers set 3, Paper 3, Foundation Tier, Question 19(b)

19 Here are two right-angled triangles.

Not drawn accurately



19 (a) Assume that triangles *AOB* and *PQO* are similar.

Work out the area of triangle *PQO*.

[3 marks]

19 (b) In fact, *QP* is longer than it would be if the triangles were similar.

How does this affect your answer to part (a)?

[1 mark]

Q	Answer	Mark	Comments
19(b)	(It is) larger	B1	oe My answer was too small
	Additional Guidance		

Practice papers set 3, Paper 1, Foundation Tier, Question 23(b)

23 The air pressure in a tyre measures 7.2 bar.
Air is leaking out at the rate of 0.2 bar per day.

23 (a) Assume that the air continues to leak at the same rate.

After how many days will the pressure measure 4.8 bar?

[2 marks]

23 (b) In fact, the rate that the air leaks out increases each day.

How does this affect your answer to part (a)?

[1 mark]

Q	Answer	Mark	Comments
23(b)	It will take fewer days	B1	oe the answer would be lower eg it will be less than 12
	Additional Guidance		
	Quicker/faster than 12 days		B1
	Quicker/faster alone		B0

Notes

Notes

Notes

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