OCR
Oxford Cambridge and RSA

H

GCSE (9–1)

Mathematics

J560/06: Paper 6 (Higher tier)

General Certificate of Secondary Education

Mark Scheme for November 2020

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

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1. Annotations available in RM Assessor. These **must** be used whenever appropriate during your marking.

Annotation	Meaning
	Correct
	Incorrect
BOD	Benefit of doubt
FT	Follow through
ISW	Ignore subsequent working (after correct answer obtained), provided method has been completed
M0	Method mark awarded 0
M1	Method mark awarded 1
M2	Method mark awarded 2
A1	Accuracy mark awarded 1
B1	Independent mark awarded 1
B2	Independent mark awarded 2
MR	Misread
SC	Special case
^	Omission sign
BP	Blank page
SEEN	Seen

For a response awarded zero (or full) marks a single appropriate annotation (cross, tick, M0 or ^) is sufficient, but not required.

For responses that are not awarded either 0 or full marks, you must make it clear how you have arrived at the mark you have awarded and all responses must have enough annotation for a reviewer to decide if the mark awarded is correct without having to mark it independently.

It is vital that you annotate standardisation scripts fully to show how the marks have been awarded.

Subject-Specific Marking Instructions

2. **M** marks are for using a correct method and are not lost for purely numerical errors.
A marks are for an accurate answer and depend on preceding **M** (method) marks. Therefore **M0 A1** cannot be awarded.
B marks are independent of **M** (method) marks and are for a correct final answer, a partially correct answer, or a correct intermediate stage.
SC marks are for special cases that are worthy of some credit.

3. The following abbreviations are commonly found in GCSE Mathematics mark schemes.

- **figs 237**, for example, means any answer with only these digits. You should ignore leading or trailing zeros and any decimal point e.g. 237000, 2.37, 2.370, 0.00237 would be acceptable but 23070 or 2374 would not.
- **isw** means **ignore subsequent working** after correct answer obtained and applies as a default.
- **nfww** means **not from wrong working**.
- **oe** means **or equivalent**.
- **rot** means **rounded or truncated**.
- **soi** means **seen or implied**.
- **dep** means that the marks are **dependent** on the marks indicated. You must check that the candidate has met all the criteria specified for the mark to be awarded.
- **with correct working** means that full marks **must not** be awarded without some working. The required minimum amount of working will be defined in the guidance column and **SC** marks given for unsupported answers.

4. Anything in the mark scheme which is in square brackets […] is not required for the mark to be earned, but if present it must be correct.

5. Unless the command word requires that working is shown and the working required is stated in the mark scheme, then if the correct answer is clearly given and is not from wrong working **full marks** should be awarded.

Do not award the marks if the answer was obtained from an incorrect method, i.e. incorrect working is seen and the correct answer clearly follows from it.

6. Where follow through (**FT**) is indicated in the mark scheme, marks can be awarded where the candidate's work follows correctly from a previous answer whether or not it was correct. For questions with FT available you must ensure that you refer back to the relevant previous answer. You may find it easier to mark these questions candidate by candidate rather than question by question.

Figures or expressions that are being followed through are sometimes encompassed by single quotation marks after the word *their* for clarity, e.g. FT 180 × (*their* '37' + 16), or FT 300 – √(*their* '52 + 72'). Answers to part questions which are being followed through are indicated by e.g. FT 3 × *their* (a).

7. In questions **with no final answer line**, make no deductions for wrong work after an acceptable answer (i.e. **isw**) unless the mark scheme says otherwise, indicated by the instruction 'mark final answer'.

8. In questions **with a final answer line and incorrect answer given**:

(i) If the correct answer is seen in the body of working and the answer given on the answer line is a clear transcription error allow full marks unless the mark scheme says 'mark final answer'. Place the annotation ✓ next to the correct answer.

(ii) If the correct answer is seen in the body of working but the answer line is blank, allow full marks. Place the annotation ✓ next to the correct answer.

(iii) If the correct answer is seen in the body of working but a completely different answer is seen on the answer line, then accuracy marks for the answer are lost. Method marks could still be awarded if there is no other method leading to the incorrect answer. Use the **M0**, **M1**, **M2** annotations as appropriate and place the annotation **×** next to the wrong answer.

9. In questions **with a final answer line**:

(i) If one answer is provided on the answer line, mark the method that leads to that answer. A correct step, value or statement that is not part of the method that leads to the given answer should be awarded **M0** and/or **B0**.

(ii) If more than one answer is provided on the answer line and there is a single method provided, award method marks only.

(iii) If more than one answer is provided on the answer line and there is more than one method provided, award marks for the poorer response unless the candidate has clearly indicated which method is to be marked.

10. In questions with **no final answer line**:

(i) If a single response is provided, mark as usual.

(ii) If more than one response is provided, award marks for the poorer response unless the candidate has clearly indicated which response is to be marked.

11. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the **MR** annotation. **M** marks are not deducted for misreads. If a candidate corrects the misread in a later part, do not continue to follow through, but award **A** and **B** marks for the correct answer only.

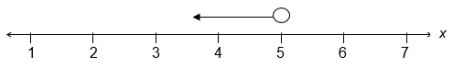
12. Unless the question asks for an answer to a specific degree of accuracy, always mark at the greatest number of significant figures even if this is rounded or truncated on the answer line. For example, an answer in the mark scheme is 15.75, which is seen in the working. The candidate then rounds or truncates this to 15.8, 15 or 16 on the answer line. Allow full marks for the 15.75.

13. Ranges of answers given in the mark scheme are always inclusive.

14. For methods not provided for in the mark scheme give as far as possible equivalent marks for equivalent work. If in doubt, consult your Team Leader.

15. If in any case the mark scheme operates with considerable unfairness consult your Team Leader.

Question			Answer	Marks	Part marks and guidance	
1	(a)		Points plotted at (210, 130) and (100, 80)	2	**B1** for 100 soi or for one point plotted correctly	Half square tolerance May be implied by point plotted at duration 100
	(b)		Point at (220, 64) circled	1		
	(c)	(i)	Ruled line of best fit drawn	1		Use overlay anchored on top right point Line must reach to edges of overlay
		(ii)	*Their* line used to give duration for £90 ± 5 minutes	1 FT	Strict **FT** from their intended straight line of best fit	NB read (*n*, 90) not (90, *n*)
	(d)		[7 hours is] is beyond the given data oe	1		Accept eg the trend may not continue

Question			Answer	Marks	Part marks and guidance	
2			$x < 5$	4	**B2** for $x < 5$ or **M1** for $3x < 19 - 4$ or better	Solution to inequality: Allow **M1** for this expression with other inequality symbols or equals sign or [x =] 5 as solution (can be implied by mark/circle on the diagram) or trials leading to selection of 5 or final correct trial using 5
			AND  		AND **B2FT** for $x < 5$, or *their* inequality, correctly shown or **B1FT** for x < 5, or *their* inequality, shown with a hollow circle and wrong arrow or filled circle and correct arrow	Displaying the solution: Display must show an inequality that fits on the number line for FT Mark to candidate's advantage either $x < 5$ or *their* inequality Accept an arrow of any length or a line reaching 1 If no solution to inequality seen: Hollow circle at 5 arrow to left **M1B2** Filled circle at 5 arrow to left **M1B1** Hollow circle at 5 arrow to right **M1B1** Filled circle at 5 arrow to right **M1B0** Mark at 5 no line or arrow **M1B0** Circle and/or arrow at other than 5 **M0B0**

Question			Answer	Marks	Part marks and guidance	
3	(a)		55.5[0] to 57.[0] nfww	3	**M1** for 1 kwH costs £0.125 oe soi	eg 225 kwH costs £28.125 ± £0.5[0] 200 kwH costs £25 ± £0.5[0] 150 kwH costs £18.75 ± £0.5[0] 100 kwH costs £12.5 ± £0.5[0] 50 kwH costs £6.25 ± £0.5[0]
					M1 for their 0.125 × 450 or cost × $\frac{450}{their \text{ equivalent electricity use}}$	eg $25 \times \frac{450}{200}$
					OR	
					M1 for finding costs of electricity that sum to 450 kwH **M1** for addition of these costs	eg award **M2** for 4 × (£12.5 ± £0.5[0]) + (£6.25 ± £0.5[0]) For the first **M1** mark, costs must be from graph within ±½ small square ie ±£0.5[0]

Question			Answer	Marks	Part marks and guidance	
	(b)		**Method 1:** By performing a calculation for A and comparing with B:		**Method 2:** By performing a calculation for B and comparing with A:	
			12.5 or 0.125 or "cost ÷ usage" using a reading from the graph or *their* (a) ÷ 450	**1**	14.3 × *their* chosen usage soi or [0].143 × *their* chosen usage soi May be implied by line on graph	Mark method not accuracy for first two marks e.g. 6.75 ÷ 50 = 0.135 but not 0.135 with no working
			14.3 or 0.143 stated or comparison against it clearly implied in a statement	**1dep**	Cost in p or £ from graph for *their* chosen usage stated	Dep on first mark scored. Costs for A and B may be in different units. e.g. 1kwH costs 12.5p which is less than Company B's charge
			"B" with 12.5 and 14.3 or "B" with 0.125 and 0.143 or "B" with 12.5 or 0.125 and a comparison against 14.3 or 0.143 clearly implied	**1**	"B" with both costs correct and in same units	No follow through e.g. B because 1kwH costs 12.5p which is less than Company B's charge
4	**(a)**		e.g. $\sqrt{\left(\frac{4\times400}{0.5\times200}\right)^3} = \sqrt{16^3} = 64$	**3**	**B2** for 4, 400, 0.5 and 200 or **B1** for at least two of 4, 400, 0.5 and 200	For full marks, at least one of these intermediate steps leading to 64 must be seen $\sqrt{16^3}$ or 4^3 or $\sqrt{4096}$

Question			Answer	Marks	Part marks and guidance	
	(b)		38.7 to 38.9	**4**	**B2** for 46.1 to 46.11 or 17.89 to 17.9 or **B1** for 12.8 to 12.9 or 3.57 to 3.6[0] or 2125 to 2126 and **M1** for (64 – *their* 46.1 to 46.11) ÷ *their* 46.1 to 46.11 [× 100] oe	Accept 39 with correct working
5	**(a)**		30 final answer	**2**	**B1** for 150 or 30 seen or **M1** for 360 ÷ 12 oe	e.g. $180 - \frac{180 \times 10}{12}$
	(b)		150 or **FT**(180 – **(a)**)	**1**		Only allow **FT** if 0 < *their* **(a)** < 180

Question			Answer	Marks	Part marks and guidance	
6			385 with correct working	6		"Correct working" requires evidence of at least **M2** AND **B1** i.e. correct and consistent units used
					M2 for [mass of one panel =] 2.4 × 1.2 × 0.018 × 750 or 240 × 120 × 1.8 × 0.750 or **M1** for figs 24 × figs 12 × figs 18 × figs 750 or 2.4 × 1.2 × 0.018 or 240 × 120 × 1.8 AND **B1** for 15 000 [kg] or 15 000 000 g seen or *their* mass correctly converted to tonnes **M1** for $\frac{figs\ 15}{their\ mass}$ **A1** for 385.[…] to 387 If **0** or **B1** scored, instead award **SC2** for answer 385 with no working or insufficient working If **0** scored **SC1** for answer 385.[…] to 387 with no working	soi by 38.8 to 38.9 [kg] soi by 38 800 to 38 900 [g] soi by 0.0518 to 0.0519 [m^3] soi by 51 800 to 51 900 [cm^3] Assume *their* mass unit from **M2**, but do not assume from **M1** only Accept any figure **but not** 2.4, 1.2, 1.8 and 750 for *their* mass For **M1** accept one or more trial(s) of *their* mass × an integer in attempt to = *their* figs 15

Question			Answer	Marks	Part marks and guidance	
7	(a)		$\begin{pmatrix}4\\-2\end{pmatrix}$	2	**B1** for 1 component correct If **0** scored, then **SC1** for $\begin{pmatrix}-4\\2\end{pmatrix}$ or $\begin{pmatrix}\frac{4}{-2}\end{pmatrix}$ or (4, -2)	Penalise first appearance of vinculum or poor form in vector but condone second use
	(b)		$\begin{pmatrix}1\\\frac{9}{4}\end{pmatrix}$ oe	2	**B1** for 1 component correct or $\begin{pmatrix}4\\9\end{pmatrix}$ seen	

Question			Answer	Marks	Part marks and guidance	
8			31 nfww	4	**M2** for 20 : 10 or $\frac{20}{30}$ and 21 : 9 or $\frac{21}{30}$ and **SC1** for final answer 30 dep on **M2** OR **M1** for at least one other fraction equivalent to $\frac{2}{3}$ seen, or one other fraction equivalent to $\frac{7}{10}$ seen <u>Alternative method using algebra</u> **M1** for $\frac{r-1}{t-1} = \frac{2}{3}$ oe or $\frac{r}{t-1} = \frac{7}{10}$ oe **M1** for $3(r-1) = 2(t-1)$ and $10r = 7(t-1)$ or better **M1** for elimination or substitution of r If **0** scored **SC1** for answer 30 with no working	<u>Notes on alternative method</u> Where number of red = *r.* Does not need to be defined. Accept any other letter. Implies first **M1** mark A correct equation in *b* may imply first **M1M1** marks

Question			Answer	Marks	Part marks and guidance	
9			$z = 1.2x$ or $z = \frac{6x}{5}$	4		Condone $\propto$ for = in **B1** marks and **SC1** but not at **B3** or full marks
					B3 for a correct equation involving just x and z but not in required form	e.g. $5z = 6x$, or $x = \frac{5z}{6}$
					OR	
					B1 for $y = 6x$ oe **B1** for $y = 5z$ oe **M1** for a correct equation involving just x and z using *their* two equations	*Their* two equations of the form $y = ax$ oe and $y = bz$ oe
					OR	
					B1 for $y = 60$ when $z = 12$ **B1** for x : [y :] z is 10 : [60 :]12 **M1** for a correct equation involving just x and z using *their* triple ratio or *their* two ratios with a common y value	Allow **B2** for other triple ratios of the form $5k : 30k : 6k$ or two correct ratios with a common y value
					If **0** scored **SC1** for $y = kx$ and $k = 6$ found oe or for $y = kz$ and $k = 5$ found oe	

Question			Answer	Marks	Part marks and guidance	
10			22	3	**M2** for 1.403 ÷ 1.15 oe soi by 1.22 or **B1** for 1.15 soi Alternative method : If starting from (1 + *k*/100) × 1.15 = 1.403 **M2** for reaching 1.15*k*/100 = 0.253 or **B1** for the 1.15	Condone answer 22%
11	(a)	(i)	7	4	**M2** for 3*x* + 15 = 2(*x* + 11) oe or **M1** for 3*x* + 15 or 2(*x* + 11) oe **M1** for a productive step towards solving *their* linear equation Alternative method by trials: **M2** for at least two complete trials using the same inputs for both functions or **M1** for one complete trial using the same input for both functions **A1** for at least one correct evaluation for A and one for B	Starting equation must have x on both sides e.g. from 3*x* + 15 = 2(*x* + 11): **M1** for 2x + 22 or x + 15 = 22 or 3x = 2x + 7 or 1.5x + 7.5 = x + 11 e.g. from 3x + 15 = 2x + 11: **M1** for x + 15 = 11 or 3x = 2x – 4

Question			Answer	Marks	Part marks and guidance	
		(ii)	Because $3x + 15$ and $2(x + 11)$ are <u>not equivalent</u> oe OR $3x + 15 = 2(x + 11)$ only has one solution oe	1		If not using the words 'not equivalent', must clearly imply that the two expressions will not be equal for *all* values of x The mark is unlikely to be awarded unless algebra is used
	(b)		$p = 5$, $q = 3$	3	**B1** for $p = 5$ or $q = 3$ **M1** for $q(x + p)$ oe or $[3x + 15 =] 3(x + p)$ or $[3x + 15 =] q(x + 5)$ If no working **SC1** for $p = 3$ and $q = 5$ as answers	 May be seen with a particular value of x, eg. $q(2 + p)$
12			$\frac{4}{28}$ oe or 0.1428 to 0.143	3	**M1** for 4 correct combinations soi by highlighting in list or table or by unsimplified numerator 4 **M1** for 4×7 soi by complete list or table or by 28 <u>Alternative method</u> **M2** for $\left(\frac{1}{4} \times \frac{1}{7}\right) + \left(\frac{1}{4} \times \frac{2}{7}\right) + \left(\frac{1}{4} \times \frac{1}{7}\right)$ oe or **M1** for $\frac{1}{4} \times \frac{1}{7}$ or $\frac{1}{4} \times \frac{2}{7}$ oe seen	Economics Engineering Geography German Geography Graphics Media Music

13			50	**4**	**B1** for 2.5 oe soi **M2** for $8 \times (5 \div 2)^2$ oe or **M1** for $(5 \div 2)^2$ soi by 6.25 oe <u>Alternative method:</u> **B1** for [AB : AC =] 2 : 5 oe soi **M2** for $(8 \div 2^2) \times 5^2$ oe or **M1** for [area ratio] $2^2 : 5^2$ oe soi <u>Alternative method:</u> **B1** for 2.5 oe soi **M1** for numerical $\frac{b \times h}{2} = 8$ where $b \times h = 16$ **M1** for $\frac{2.5\ their\ b \times 2.5\ their\ h}{2}$ <u>If evidence of using 2 : 3 seen:</u> **B0** for [AB : AC =] 2 : 3 or 1.5 oe soi **M2** for $(8 \div 2^2) \times 3^2$ oe or **M1** for [area ratio] $2^2 : 3^2$ or 1.5^2 oe soi <u>If no working:</u> **SC1** for final answer 18	Final answer 20 implies **B1** (from use of linear scale factor) 6.25 scores **B1M1** $2^2 : 5^2$ scores May be seen in stages

Question			Answer	Marks	Part marks and guidance	
14			2.99 [cm] with correct working	5	**M3** for $\frac{5}{3}\pi r^3 + \pi r^3 = 225$ soi by $\frac{8}{3}\pi r^3 = 225$ **A1** for $\sqrt[3]{\frac{675}{8\pi}}$ or $\sqrt[3]{26.8}$ to $\sqrt[3]{26.9}$ or **M2** for $\frac{1}{3}\pi r^2 \times 5r + \pi r^2 \times r$ oe soi by $\frac{8}{3}\pi r^3$ or **M1** for $\frac{1}{3}\pi r^2 \times 5r$ oe or $\pi r^2 \times r$ oe If **0** or **M1** scored, instead award **SC2** for answer 2.99 or greater rot accuracy of 2.9947090608… with no working or insufficient working If **0** scored **SC1** for $\sqrt[3]{\frac{675}{8\pi}}$ or $\sqrt[3]{26.8}$ to $\sqrt[3]{26.9}$ with no working	"Correct working" requires evidence of at least M2 Accept 2.99 or greater rot accuracy of 2.9947090608 with correct working Accept 3[.0] as final answer only after **M3A1** Trials: Full marks for trials leading to an answer 2.99 or greater rot accuracy of 2.9947090608… Trials leading to any other final answer, including 3[.0], only score the **M** marks if seen

Question			Answer	Marks	Part marks and guidance	
15			$\frac{9}{16}$ or [0].5625 oe	4	**B1** for 0.75 oe seen **M2** for 0.25 × 0.3 + *their* 0.75 × 0.65 or **M1** for 0.25 × 0.3 soi by 0.075 or $\frac{3}{40}$ oe or for *their* 0.75 × 0.65 soi by 0.4875 or $\frac{39}{80}$ oe	Accept [0].56 or [0].563 as final answer for full marks if **B1M2** earned Award **B** and **M** marks for equivalent working with a base value e.g. 100 buses
16	(a)		[angle in a] semi-circle oe	1		Accept other reasoning if fully justified
	(b)		13.5 to 13.6	4	**B1** for angle BAC = 58˚ or angle ABC = 32˚ **M2** for 16sin(*their* 58) or 16cos(*their* 32) or **M1** for $\sin(their\ 58) = \frac{BC}{their\ 16}$ or $\cos(their\ 32) = \frac{BC}{their\ 16}$ or better If **0** or **B1** scored then instead award **SC2** for 6.7 to 6.8 as final answer <u>Grads or rads:</u> If **0, 1** or **2** scored then instead award **SC3** for 15.8[8…] to 15.9 or 12.6[4…] as final answer **or** If **0** scored award **SC1** for 7.9[4…] or 6.3[2…]	May be seen on diagram or implied by use of sin58 or cos32 Only award **M** marks if *their* angle and trig ratio are consistent ie do not accept 16sin32 unless angle BAC previously seen as 32.

Question			Answer	Marks	Part marks and guidance	
17	(a)		75	1		
	(b)		3 [×]$\left(\sqrt{5}\right)^{n-1}$ oe	3	**M2** for expression of correct form with two correct elements or **M1** for expression of correct form with one correct element	eg 3 [×]$\left(\sqrt{5}\right)^{n}$ eg 5 [×]$\left(\sqrt{5}\right)^{n}$
18			$\frac{412}{990} = \frac{206}{495}$ with correct working or $\frac{41.2}{99} = \frac{206}{495}$ with correct working	3	**M2** for 1000x [–] 10x = 416.16[1...] [–] 4.16[1...] leading to 990x = 412 or for 100x [–] x = 41.616[1…] [–] 0. 416[1...] leading to 99x = 41.2 or **M1** for 10x = 4.16[1…] or 100x = 41.616[1…] or 1000x = 416.16[1…] seen	"Correct working" requires **M2** Subtractions can be implied
19	(a)		[x =] -3, 1.5	2	**B1** for 1 correct	
	(b)	(i)	[a =] 2 [b =] -5	2	**B1** for each or for 2x – 5 seen	

Question			Answer	Marks	Part marks and guidance	
		(ii)	$y = 2x - 5$ or FT $y =$ *their* $ax +$ *their* b ruled on grid	**M2**	**M2** and **M1** apply to $y = 2x - 5$ or **FT** $y =$ *their* $ax +$ *their* b **M1** for 'correct' y-intercept or for 'correct' gradient or for freehand or broken 'correct' line or for at least 3 'correct' plots and no 'incorrect' plots	For **M2** line must cross curve For **M2** and **M1**, accuracy 1 small square at y-intercept (extended if necessary provided it fits on the grid) and gradient ±1 small square vertically for a run of 1 unit horizontally **Do not FT** if $a = 0$ or $b = 0$
			1.1 to 1.3 and -1.8 to -1.6	**A1**		Only award if **M2** scored
20			-9	**4**	**M2** for $\binom{7}{2k+11}$ or **M1** for $\binom{7}{}$ or $\binom{}{2k+11}$ or $\binom{4}{2k}$ **M1** for (*their* $2k + 11$) = – (*their* 7)	*their* 7 must follow from their working for **M2** and must not be -1

Question			Answer	Marks	Part marks and guidance	
21			$\frac{2x-1}{x+2}$ as final answer	6	**M1** for $x^2 - 4 = (x + 2)(x - 2)$ soi in the denominator AND **M3** for all 3 fractions combined with quadratic common denominator and expanded numerator or **M2** for correct products on numerator of at least 2 equivalent fractions that are consistent with their common denominators or **M1** for correct product on numerator of 1 fraction that is consistent with an attempted common denominator AND **M1dep** for $\frac{(2x-1)(x-2)}{(x+2)(x-2)}$ or $\frac{(2x-1)(x-2)}{x^2-4}$ (**dep** on previous **M3** earned)	e.g. $\frac{6x}{(x+2)(x-2)}$ seen, or a common denominator of $(x + 2)(x - 2)$ later expanded to $x^2 - 4$ e.g. $\frac{x^2-2x+x^2+x+2x+2-6x}{(x+2)(x-2)}$ soi by $\frac{2x^2-5x+2}{(x+2)(x-2)}$ e.g. $\frac{x(x-2)}{(x+2)(x-2)}$ oe and $\frac{(x+1)(x+2)}{(x+2)(x-2)}$ oe e.g. $\frac{x(x-2)}{(x+2)(x-2)}$ oe Factorises numerator of combined fraction Can earn up to **M1 + M2 + M0** for common denominator used that is not in its lowest terms. eg. **M0 + M2** for $\frac{x(x-2)(x^2-4)}{(x+2)(x-2)(x^2-4)}$ and $\frac{(x+1)(x+2)(x^2-4)}{(x+2)(x-2)(x^2-4)}$ eg. **M1 + M1** for $\frac{x(x-2)(x+2)(x-2)}{(x+2)(x-2)(x+2)(x-2)}$

Q1(d)

Response		Mark
No because it does not have a record for 7 hours	This scores 0 as there is no record for e.g. 80 min. Must imply “beyond”	**0**
7 hours isn't on the scale.	No. Implies a bigger diagram would be OK	**0**
No Because 420 minutes is too long to fit on the graph	Implies it would be OK with a bigger graph	**0**
No It only shows 2h 50 minutes	Suggests 7 hours is a missing value	**0**
No It would go up to 4200.	No implies scale not long enough	**0**
No Highest duration is 250 mins which isn't 7 hours. 420 mins is 7 hours.	No. Implies a bigger diagram would be OK	**0**
No His records only go up to 4hours 10minutes.	No. This is about the scale. However, if they had said 4 hours, then they would have been talking about the data	**0**
No It does not show this information. 7x60 = 420mins. Graph only goes up to 250mins.	No scale again	**0**
No His record doesn't show any 7 hour flights.	No. Implies it is a missing value	**0**
No It would not fit on the graph.	No. Implies it is a missing value	**0**
No Duration only goes to 250 mins.	No. Implies it is a missing value	**0**
No Graph does not go beyond 250 minutes. 60x7 = 420mins.	No. Implies it is a missing value	**0**
No Duration does not go up to 7 hours.	No. Implies a bigger diagram would be OK	**0**
No Extrapolation	Not explained	**0**
No. Should not extrapolate beyond 250 minutes/the graph	Graph not big enough	**0**
No. Extrapolating too far meaning his estimate would be inaccurate	Not quite sufficiently clear. What is “too far” and is it from 240 or 250?	**0**
No. The data only shows a maximum of a 250 minute flight so this would be unreliable	Contradiction. 240 rather than 250 would have been acceptable.	**0**
No There are only less amount of flights on the diagram.	Yes. This implies “beyond the data”	**1**
No because the duration only goes up to 240 minutes	Scores the mark for implying beyond the data	**1**
No because it does not have records that go as far as 7 hours.	This is OK as it implies “beyond”	**1**
No. Should not extrapolate beyond 240 minutes/the data	Beyond the data	**1**

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