

Foundation

GCSE

Mathematics - Paper 3

J560/03: Paper 3 (Foundation tier)

General Certificate of Secondary Education

Mark Scheme for June 2022

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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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MARKING INSTRUCTIONS

PREPARATION FOR MARKING RM ASSESSOR

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *RM Assessor Online Training*; *OCR Essential Guide to Marking*.
2. Make sure that you have read and understood the mark scheme and the question paper for this unit. These are available in RM Assessor.
3. Log-in to RM Assessor then mark and annotate the **required number** of practice responses (“scripts”) and the **required number** of standardisation responses.

MARKING

4. Mark strictly to the mark scheme.
5. Marks awarded must relate directly to the marking criteria.
6. The schedule of dates is very important. It is essential that you meet the RM Assessor 50% and 100% deadlines. If you experience problems, you must contact your Team Leader (Supervisor) without delay.
7. If you are in any doubt about applying the mark scheme, consult your Team Leader via the RM Assessor messaging system.
8. Where a candidate has crossed out a response and provided a clear alternative then the crossed out response is not marked. Where no alternative response has been provided, examiners should give candidates the benefit of the doubt and mark the crossed out response where legible.
9. When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.
10. On each blank page the annotation **BP** must be inserted to confirm that the page has been checked. For additional objects (if present), a tick must be inserted on each page to confirm that it has been checked.

11. There is a NR (No Response) option. Award NR (No Response)
- if there is nothing written at all in the answer space
 - OR if there is a comment which does not in any way relate to the question (e.g. 'can't do', 'don't know')
 - OR if there is a mark (e.g. a dash, a question mark) which is not an attempt at the question.



The hash key (#) on your keyboard will enter NR.

Note: Award 0 marks for an attempt that earns no credit (including copying out the question).

12. The RM Assessor **comments box** is used by the Principal Examiner or your Team Leader to explain the marking of the practice responses. Please refer to these comments when checking your practice responses. **Do not use the comments box for any other reason.**

If you have any questions or comments for your Team Leader, use the RM Assessor messaging system.

13. Assistant Examiners should send a brief report on the performance of candidates to their Team Leader (Supervisor) by the end of the marking period. Please follow the direction of your Team Leader about which questions you should report on and how to submit your report. Your report should contain notes on particular strengths displayed as well as common errors or weaknesses.
14. 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

15. **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.
16. 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.
 - **nfw** 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.
17. 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.
18. 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.
19. 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 $180 \times (\textit{their} '37' + 16)$, or FT $300 - \sqrt{(\textit{their} '52 + 72')}$. Answers to part questions which are being followed through are indicated by e.g. FT $3 \times \textit{their} (a)$.

20. 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'.
21. 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.
22. 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.
23. 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.
24. 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.

25. 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.
26. Ranges of answers given in the mark scheme are always inclusive.
27. 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.
28. If in any case the mark scheme operates with considerable unfairness consult your Team Leader.

Question		Answer	Marks	Part marks and guidance	
1	(a)	One of, 1, 2, 3, 6, 9, 18	1		Accept more than one correct but no errors May be a product e.g. 2×9 but not 2×3^2 or an incorrect product e.g. 2×6
	(b)	16	1		Mark the answer line Accept $4^2 = 16$ as answer but not 4^2
	(c)	[0].25	1		Ignore additional zeros after 5
	(d)	5 and 8	2	Mark final answer M1 for a pair seen that either multiply to give 40 or add to give 13	For M1 , accept non-integers and negatives Accept answers 8×5 and $8 + 5$
2	(a)	2 correct lines of symmetry only	1		Mark intention condoning freehand use BOD Lines should be approx half diameter or longer by eye and intersect within the crossbar and one be within the crossbar. If more than one drawing and no clear choice, mark the worst (2a and 2ci)
	(b)	4	1		

Question		Answer	Marks	Part marks and guidance	
	(c) (i)	Sketch of a quadrilateral with exactly one line of symmetry	1		Mark intention and condone freehand kite or isosceles trapezium or arrowhead. If kite, must not appear to have two pairs of parallel sides e.g. look square L of S need not be seen
	(c) (ii)	Name consistent with sketch	1dep	Dep on (c)(i) being a recognisable quadrilateral	Condone poor spelling Mark name based on your decision for shape in (i)
3	(a)	<ul style="list-style-type: none"> • •• ••• •••• ••••• 	1		May be at the end of the sequence
	(b)	<p>15</p> <p>Add 2 [each time] or goes up in 2s oe or $2n - 1$ oe or correct calculation leading to 15 using 7, 8, or values from given terms e.g. $7 + 8$ or $2 \times 7 + 1$ or 8 [dots] and 7 [dots] or [1, 3, 5, 7, 9] 11, 13, 15</p>	1 1		Ignore a drawing Do not accept “odd numbers” but accept “the eighth odd number” oe Mark the best part if no contradiction 8 + 7 may be 8 on left, one less on right 2 times previous pattern number + 1 oe
4	(a)	Diameter drawn	1		Allow freehand intended straight. No white paper seen between line and centre and line and circumference. Ends no more than 2mm by eye beyond circumference If two lines mark the worst
	(b)	Chord	1		Condone poor spelling

Question		Answer	Marks	Part marks and guidance	
5	(a)	H5 H6 H8 T5 T6 T7 T8	2	B1 for 5 correct in correct place	Accept 5H etc
	(b)	$\frac{1}{4}$	2	B1 for $\frac{\textit{their 2}}{8}$ isw If 0 scored, SC1 for 0.25 or 25%	Follow through <i>their</i> number of "T and even number" from table in (a)
6		Kai and correct value(s) used/referred to in reason 7 or 14 and 13 [# right] Accept $\frac{13}{20}$ and $\frac{14}{20}$ or 35% and 30% [% wrong] or 70% [% right]	3	B2 for 7 or M1 for $\frac{35}{100} \times 20$ oe or B2 for 13 and 14 or M1 for $\frac{65}{100} \times 20$ oe or B1 for 13 or B2 for 30% and 35% or M1 for $\frac{6}{20} [\times 100]$ oe or B1 for 30% or B2 for 70[%] or M1 for $\frac{14}{20} [\times 100]$ oe	Value(s) may be in working space. Reference may be e.g. He got more right oe with 7 or 70% seen. Ignore extra statements if no contradiction Accept [0].35 and [0].3[0] for % Accept [0].65 and [0].7[0] for %
7	(a)	He has not used [masses in] the same units or correct example of amounts e.g. [4kg and] 1kg [of butter] or 4g [of flour] [and 1g]	1		See appendix Accept amounts for masses The units are mixed/not the same Do not accept "measurements" for "units" but may be clarified later Mark the best part if no contradiction

Question		Answer	Marks	Part marks and guidance	
	(b)	1 : 9	2	B1 for $\frac{1}{10} : \frac{9}{10}$ or 10 : 90 or 2 : 18 or 0.1 : 0.9 If 0 scored SC1 for answer 9 : 1	Must be a ratio to earn marks
8	(a)	6a final answer	1		Condone poor algebra e.g. $6 \times a$ and $a \times 6$ but not a^6
	(b)	$\frac{1}{2}x^4$ or $\frac{x^4}{2}$ or $0.5x^4$ final answer	2	B1 for $0.5x^k$ $k \neq 0$ or gx^4 $g \neq 0$ as answer	Condone 1 before term in x Allow $\frac{x^5}{2x}$ and $\frac{2x^4}{4}$ for B1
9		249.6[0]	3	M2 for $\frac{4}{3} \times 23.4[0] \times 8$ oe or M1 for $\frac{4}{3} \times 23.4[0]$ oe soi by 31.2[0] or $23.4[0] \times 8$ soi by 187.2[0]	Accept only 249.6[0] for 3 marks Accept $1\frac{1}{3}$ or 1.3[33...] for $\frac{4}{3}$ oe = $23.4 \div 3 = a$, $a \times 4 \times 8$ oe = $23.4 \div 3 = a$, $a \times 4$
10	(a)	$\frac{2}{8}$	1		Accept equivalent fractions eg $\frac{1}{4}$ or $\frac{4}{16}$

Question		Answer	Marks	Part marks and guidance	
	(b)	<p>15 ÷ 4 oe or 15 ÷ 8 × [2 or 6] oe</p> <p>3.75 oe or 1.875 or 11.25 and recognise not integer</p> <p>OR</p> $\frac{R}{R+B} = \frac{3}{12} \text{ and } \frac{4}{16}$ <p>or</p> <p>R:B = 3:9 and 12 sides and 4:12 and 16 sides</p> <p>15 is missing oe</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>If 0 scored, SC1 for 15 is not a multiple of 4 or 8 oe</p>	<p>No FT as the scale can be used but allow 15 × (0.25 or 0.75) for M1</p> <p>May be fractions</p> $\frac{R}{B} = \frac{3}{9} \text{ and 12 sides etc}$ <p>oe e.g. 4, 8, 12, 16 and 15 is not here</p>
11		60	2	<p>M1 for $\frac{400 \times 3 \times 5}{100}$ oe</p> <p>If 0 scored, SC1 for answer 460</p>	<p>Any attempt at compound interest scores 0</p> <p>M1 May be in stages</p> <p>eg $400 \times \frac{3}{100} = 12$</p> <p>and 12 × 5</p> <p>M1 Allow 4 × 3 × 5 or 12 × 5</p>
12		167	4	<p>M1 for 375 × 1.15 soi by 431.25</p> <p>M1 for (their euros) – 217.49</p> <p>M1 for their 213.76 ÷ 1.28 oe</p>	<p>213.76 implies M1M1</p> <p>Must be linked to 375 but do not accept 375 as euros</p> <p>May be their 213.76 × 0.781[...]</p>

Question		Answer	Marks	Part marks and guidance	
13		120 with correct working	5	<p>M2 for $1 - (\frac{2}{5} + \frac{5}{12})$ oe soi $\frac{11}{60}$</p> <p>or</p> <p>M1 for $\frac{2}{5} + \frac{5}{12}$ oe soi $\frac{49}{60}$</p> <p>AND</p> <p>M2 for $22 \div$ <i>their</i> $\frac{11}{60}$ oe</p> <p>or</p> <p>M1 <i>their</i> $\frac{11}{60}$ equated to 22</p> <p>If 0 or M1 scored, instead award SC2 for 120 as final answer with no or insufficient working.</p>	<p>Correct working requires evidence of at least M1M1 or M2</p> <p>Equivalent fraction or [0].183 to [0].184</p> <p>Equivalent fraction or [0].816 to [0].817</p> <p>Accept in decimals but <i>their</i> $\frac{11}{60}$ must come from some working</p> <p>May be $22 \div 11 \times 60$</p> <p>May be $22 \div$ <i>their</i> 11</p> <p>or <i>their</i> $\frac{11}{60} = \frac{22}{k}$</p>
14	(a)	30	3	<p>B1 for [median =] 3.5</p> <p>M1 for <i>their</i> median $\times 10 - 5$</p>	<p>Accept only 30 for 3 marks</p> <p>If 4 (mode) or 3 (mean) or other wrong value from 1 to 4 used M1 still available.</p>

Question		Answer	Marks	Part marks and guidance	
	(b)	At least one from 1, 4, 5, 5 2, 4, 5, 5 3, 4, 5, 5 or one judge awards 1, 2 or 3 oe and 4, 5, 5 [stay the same]	2	B1 for four values in order with median 4.5 with one not from 1 to 5 or for one judge awards 1, 2 or 3 without mentioning 4, 5, 5	Condone inclusion of 4, 4, 5, 5, with another correct list. Accept 1 to 3 for 1, 2 or 3 and condone 4 included e.g. 1 to 4 Accept “the rest stay the same” oe for 4, 5, 5
15		5 nfw	4	B2 for $[a =] 4$ or M1 for $9a = 36$ or better and M1 for showing substitution/use of their a e.g. $4 \times \textit{their } 4 + 4b = 36$ oe or better or $[b =] 9 - \textit{their } 4$	If another value for a is used to find b do not award B2 T&I only scores if ending at 4 or better may be e.g. $a + b = 9$ or $\frac{36 - 4 \times \textit{their } 4}{4}$
16	(a)	6	1		
	(b)	-3	1		

Question		Answer	Marks	Part marks and guidance										
17		315	4	<p>B3 for answer 630 or 945 or 1260 or M3 for $3 \times 3 \times 5 \times 7$ or $5 \times 7 \times 9$</p> <p>OR</p> <p>M1 for [35 =] 5 and 7 M1 for [45 =] 3 and 3 and 5</p> <p>OR</p> <p>M1 for 35, 70, 105, 140, (... 280, 315) M1 for 45, 90, 135, 180, (... 270, 315)</p>	<p>Accept final answer 3.15 m for 4 marks. Ideally “cm” would be crossed out but BOD if not</p> <p>May be in factor tree Allow 9 and 5</p> <p>Must have first 4 correct in each list</p>									
18	(a)	425	2	M1 for $680 \div 1.6[0]$ oe	e.g. $[0].68[0] \div [0].0016$									
	(b)	1600 or 1.6×10^3	1											
19	(a)	$x^2 + [1]x - 20$ final answer	2	M1 for at least three of x^2 , $[+]5x$, $-4x$, -20	<p>M1 may be seen in a table e.g.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>x</td> <td>-4</td> </tr> <tr> <td>x</td> <td>x^2</td> <td>$-4x$</td> </tr> <tr> <td>$[+]5$</td> <td>$[+]5x$</td> <td>-20</td> </tr> </table> <p>$[1]x$ counts as two terms M1 for $x^2 + [1]x + -20$</p> <p>Do not accept poor algebra e.g. x^5 for $5x$ or $x \times x$ for x^2</p>		x	-4	x	x^2	$-4x$	$[+]5$	$[+]5x$	-20
	x	-4												
x	x^2	$-4x$												
$[+]5$	$[+]5x$	-20												
	(b)	$(x - 5)(x + 5)$ final answer	1		Condone missing final bracket.									
20	(a)	All branches completed with 0.55 and 0.05 in correct places	3	<p>B1 for 0.55 correctly placed at least once B1 for 0.05 correctly placed at least once</p>										

Question		Answer	Marks	Part marks and guidance	
	(b)	0.4×0.4 $+ 0.55 \times 0.55$ $+ 0.05 \times 0.05$ [=0.465]	3	<p>M2 for 0.4×0.4, 0.55×0.55 and 0.05×0.05 may be 0.16 0.3025 0.0025 or M1 for 0.4×0.4 or 0.55×0.55 or 0.05×0.05 may be 0.16, 0.3025, 0.0025</p>	<p>Answer given: for 3 marks products and additions must be explicitly seen Accept e.g. $(0.4)^2$ for 0.4×0.4 Values may be seen on diagram in (a) <u>If all values</u> shown on ends of tree, must select 3 values to use for M2 and 1 value for M1 Equivalent fractions are OK but, for 3 marks must convert to the decimal</p>
21		$[x =] 4$ $[y =] -1$	3	<p>M1 for correct method to eliminate one variable B1 for $x = 4$ B1 for $y = -1$ If 0 scored SC1 for a pair of values that satisfy one of the original equations</p>	<p>Allow one arithmetic error in subtraction of terms or in rearrangement If previously rearranged must be correct rearrangement</p>

Question		Answer	Marks	Part marks and guidance
22		Yes, with full supporting evidence	5	<p>B2 for 175 or M1 for 250×0.7 oe</p> <p>AND</p> <p>M2 for $\frac{250-10}{11+3+1} \times 11$ soi 176 or M1 for $\frac{250-10}{11+3+1}$ soi 16</p> <p><u>Alternative Method</u></p> <p>M2 for $\frac{250-10}{11+3+1} \times 11$ soi 176 or M1 for $\frac{250-10}{11+3+1}$ soi 16</p> <p>AND</p> <p>M2 for $\frac{\textit{their} 176}{250} \times 100$ soi 70.4 or 0.7 and 0.704 seen or M1 for $\frac{\textit{their} 176}{250}$ soi 0.704</p> <p>“Full supporting evidence” requires B2M2 or M2M2 Non-Calculator methods e.g. $250 \div 10 = [], [] \times 7 = 176$ M1</p> <p>Allow $\frac{240}{15}$ for $\frac{250-10}{11+3+1}$</p> <p>If using 250 for 240, <i>their</i> 176 will be 183[. ...]</p>

Question		Answer	Marks	Part marks and guidance	
23	(a)	16	1		Do not accept coordinates Condone $y = 16$
	(b)	5	1		Do not accept coordinates Condone $x = 5$
24	(a)	1852 1945	3	<p>B2 for 1852 or 1945 or 1852.2 with either 1944.[6] or 1944.8[1] or M1 for $1764 \times \frac{5}{100} + 1764$ oe soi 1852.2</p>	<p>e.g. 1764×1.05 e.g. 1600×1.05^3 NC% methods M1 for e.g. $1764 \div 10 = [x]$. $[x] \div 2 = [y]$. $[y] + 1764$</p>
	(b)	Correct curved graph	3	<p>B2 for 5 of <i>their</i> points plotted correctly or B1 for 4 of <i>their</i> points plotted correctly or 5 of <i>their</i> points plotted at correct height but incorrect time</p>	<p>$\frac{1}{2}$ square accuracy</p> <p><u>Stick graph</u> mark heights as points max B2 If stick graph and curve regard as choice and mark points/heights only <u>Bar chart</u> If points clearly marked, mark the points If points not clear B0 Ruled line or line segments max B2</p>
	(c)	Increases [to 2000] Flattens/levels off/plateaus/horizontal [at 2000]	1 1		<p>See Appendix 2000/the maximum must be seen once for 2 marks Accept approx/about 2000 Condone embellishments such as "slight fall" after correct statement or reference to line of best fit</p>

Question		Answer	Marks	Part marks and guidance
25		25[%] with correct working	5	<p>“correct working” requires at least M2 or M1M1 the first M1 implied by B2</p> <p>B2 for 12 600 or M1 for $18\,000 \times \frac{70}{100}$ oe or $18\,000 \times \frac{30}{100}$ oe</p> <p>AND M2 for $\frac{\text{their } 12600 - 9450}{\text{their } 12600} [\times 100]$ oe or M1 for $\frac{9450}{\text{their } 12\,600} [\times 100]$ oe</p> <p>If 0 or M1 scored, instead award SC2 for answer 25[%] with no or insufficient working</p> <p>If 0 scored, award SC1 for 0.25 or 0.75 or 75[%] with no or insufficient working</p> <p>M0 for e.g. 70% of 18 000 M0 for e.g. 70% \times 18 000</p> <p>Accept 3150 for numerator M2 may be $\left(1 - \frac{\text{their } 9450}{\text{their } 12600}\right) [\times 100]$ M1 may be seen as $\frac{9450}{18000} = 0.525$ and then followed by $\frac{0.525}{0.7}$</p> <p><u>Trials for second M marks</u> M2 for $12600 \times 0.25 = 3150$ or M1 for $12600 \times 0.75 = 9450$</p> <p><u>Equation method</u> B2M2 $p/100 \times 12600 = 3150$; leading to $p = 25$ (scores 5 marks) B2M1 $p/100 \times 12600 = 9450$; leading to $p = 75$ B2M1 $18000 \times 0.7 \times m = 9450$ leading to $m = 0.75$, as 12600 implied within this</p>

Question	Answer	Marks	Part marks and guidance
26		864 with correct working	<p>6</p> <p>M1 for $\frac{12 \times 16}{2} \times 18$ oe A1 for 1728</p> <p>or M1 for $\frac{12 \times 16}{2}$ oe</p> <p>AND</p> <p>M1 for $\sqrt[3]{\text{their } 1728}$ A1 for 12</p> <p>AND</p> <p>M1 for $6 \times (\text{their } 12)^2$</p> <p>If 0, 1 or 2 scored, instead award SC3 for 864 as final answer with no working or insufficient working</p> <p>If 0 or M1 scored, instead award SC2 for 12 seen as dimension of cube or $(\sqrt[3]{3456})^2 \times 6$ soi 1371 to 1372 with no working or insufficient working</p> <p>If 0 scored, award SC1 for 1728 or $\sqrt[3]{3456}$ soi 15.1[...]with no working or insufficient working</p> <p>"correct working" requires at least M1M1</p> <p>Accept e.g. $12 \times 8 \times 18$ or 96×18</p> <p>Allow $12^3 = 1728$ for M1A1 1728 must be from correct method for volume of triangular prism</p> <p><i>Their</i> 12 must come from use of volume of triangular prism and cube root</p>

APPENDIX

Non Calculator methods for percentages.

Labels only

This is when labels such as 10% = are used.

If only labels are used the final answer scores full marks if it is correct.

Condone a numerical slip if the answer is correct.

If there is an error in the values and so the **final answer is incorrect** this cannot score method marks

e.g. Find 65% of 80

Method scoring M1A1

$$10\% = 8$$

$$5\% = 4$$

$$50\% = 40$$

$$65\% = 52 \quad \checkmark \quad \text{M1A1}$$

$$10\% = 8$$

$$5\% = 5 \quad \times$$

$$50\% = 40$$

$$65\% = 52 \quad \checkmark \quad \text{M1A1}$$

condone this slip as answer correct

Method scoring M0A0

$$10\% = 8$$

$$5\% = 6 \quad \times$$

$$50\% = 40$$

$$65\% = 54 \quad \times \quad \text{M0}$$

Do not condone this slip as answer incorrect

Build up method

This is where the candidate finds the percentages to build up to the required value but shows the operations used.

e.g. Find 65% of 80

$$10\% = 80 \div 10 = x$$

$$5\% = x \div 2 = y$$

$$50\% = x \times 5 = z$$

$$65\% = x + z + y$$

Because the operations have been shown and they are correct, if there is an error in one of x , y or z , method marks can still be earned

7a

Reason	Judgement	Mark
He should have converted the kg into grams	Correct	1
He only put a gram of butter when it should have been a kilogram	Correct	1
He used kg and g and these should be the same	Allow these referring to units	1
He only used 1 g but it should be 1 kg	Correct example	1
He should have used 4 g of flour	Correct example of matching units	1
The measurements should be 4000 g and 1000 g	Correct example in correct order If order incorrect must tell us which is butter/flour	1
He should have used 4 kg and 1000 g	Correct example even though using mixed units	1
He added too little butter because he measured in different units	The first part is correct but would, on its own, not get the mark	1
Rowan has used the wrong units as he has used the ratio 4000 : 1	Allow example of the ratio he has used An alternative would be 4 : 0.001	1
He didn't put the ratio back to the original numbers	Incorrect as "original" undefined	0
They are different amounts of measurements	Do not accept amounts or measurements for units	0
They should have made the conversions the same	Should be, Should make units the same	0
He only used 1 g of butter	No comparison	0
He used 1 g and it's too small	No comparison	0
They got the units wrong	Does not say that the units should be the same	0
He added too much butter and he measured in different units	First part is incorrect so award 0	0

24c

Reason	Judgement	Mark
It would increase to 2000 then stay at 2000	Correct correct	1 1
Once it reaches 2000 it will plateau	Reaches 2000 implies increasing It will plateau is fine	1 1
It would increase to approx. 2000 and then remain more or less constant around this value.	approx. is okay. 2000 referenced at least once.	1 1
Keep increasing as 2000 is a little way up the scale.	Increase is fine	1 0
It will increase and continue past the maximum Then it will fall as fish will die	Award for "It will increase" Doesn't say the line will level off	1 0
After the 5th year the graph would be capped at 2000, only allowing 55 more fish in the lake.	Implies increase in graph BOD The description is for what is happening in the lake and not the shape of the graph	1 0
The line continues up and then falls	Continues up is enough but without the up, would not get the mark Falls is incorrect	1 0
It would cause it to slow down in the rate of increase and would then cause it to plateau.	Describes increase True. No mention of 2000. Max 1 mark	1 0
The line of best fit would hit a peak.	Not awarded as the peak could be at the end of the line so "up" not implied.	0 1
It would eventually plateau and level out with no increase.	No mention of increase (to 2000)	0 1
The line will continue to 2000 Then it will go along the x-axis	Correct as "the line continues" and max/2000 imply going up Incorrect as it is parallel to the x-axis, not along it	1 0
It starts to decrease...then not go past 2000 Once at 2000 it will stay around the same place	Incorrect should be increase Staying around the same place BOD for value	0 1
After 4 years the shape would no longer increase. It'll stay at 2000 with a horizontal line on 2000.	Incorrect. Correct	0 1
It would plateau/level off at 2000 fish	No mention of graph increasing 2000 then staying there.	0 1
It would become a horizontal straight line		0 1

The graph would plateau as no fish are being added or taken away	No mention of increase Correct for plateau	0 1
4 years almost 2000 fish(1995) so the graph would plateau as no more fish can live in the pool	No increase Plateau	0 1
It would not increase. The line of best fit would level off and perhaps sometimes slightly decrease.	Wrong (but It would not increase past 2000 implies curve increasing for 1 mark) Level off okay, condone the rest as not contradicting	0 1
It will exceed the maximum amount of fish	Describing what is going on in the lake not the shape of the graph	0 0
Would start plateauing downward becoming more and more flat as less fish were present year by year.	No mention of increase (or 2000) Spoilt for second mark as suggests going down so is contradictory	0 0
The graph curves as the max capacity is exceeded	Ruled out as a possible interpretation is that it has already reached maximum and it then curves in some direction	0

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