Foundation

GCSE

Mathematics - Paper 3

J560/03: Paper 3 (Foundation tier)

General Certificate of Secondary Education

Mark Scheme for June 2024

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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.

MARKING INSTRUCTIONS

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

1. Mark strictly to the mark scheme.

2. Marks awarded must relate directly to the marking criteria.

3. 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.

4. If you are in any doubt about applying the mark scheme, consult your Team Leader via the RM Assessor messaging system.

5. 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.

6. When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

7. 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.

8. Award No Response (NR) if:
   - there is nothing written in the answer space

   Award Zero '0' if:
   - anything is written in the answer space and is not worthy of credit (this includes text and symbols).

   Team Leaders must confirm the correct use of the NR button with their markers before live marking commences and should check this when reviewing scripts.

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).

8. 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.

9. 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.

10. 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

Annotation	Meaning
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

11. **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.

12. 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.

13. 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.

14. 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.

15. 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).

16. 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'.

17. 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.

18. 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.

19. 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.

20. 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.

21. 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.

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

23. 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.

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

Question			Answer	Marks	Part marks and guidance	
1	(a)		prism	1		Mark answer line; If nothing on the answer line, may be indicated in the list Accept other correct words e.g "triangular prism"
	(b)	(i)	12	1		
	(b)	(ii)	350	2	**M1** for 7 × 10 × 5 oe	Accept e.g. 70 × 5
2			24 [kg] 12 [kg]	2	**B1** for each or **M1** for 44 ÷ 5.5 may be implied by 8 or 36 ÷ 4.5 or 36 ÷ 1.5	Accept working in g but final answer must be correct 8 used in multiplication or division e.g. 8 ÷ 2 then added to 8 Method may be seen with multipliers as e.g. 3 × (1, 3) ÷2 (1.5) 8 (A) × 3 ÷2 (B)
3	(a)	(i)	1296	1		
	(a)	(ii)	23	1		Accept ± or – or + before 23
	(b)		1728	2	**M1** for 12 × 12 × 12 oe	1.728×10^3 scores M1
4			250	2	**M1** for 207.5 ÷ 0.83 oe implied by figs 25[0]	**M1** may be implied by a list, 0.83, 1.66, 2.49,… but must reach 207.5 or beyond

Question			Answer	Marks	Part marks and guidance	
5	(a)		68.7	3	**B2** for answer 68.6 or 68.65 to 68.67[0...] or $68.\dot{6}$ or **M1** for 103 ÷ 3 soi 34.3[3…] or 103 × 2 soi 206	$\frac{2}{3}\times$ 103 implies **M1** but not $\frac{2}{3}$ **of** 103 Condone 0.66 to 0.67 or $0.\dot{6}$ for $\frac{2}{3}$ If $\frac{2}{3}$ seen = a decimal < 1 allow the decimal × 103 to imply **M1**
	(b)		$\frac{1}{5}$	3	**B2** for $\frac{400}{2000}$ oe or **B1** for 2000 [m] or [0].4 [km]	Condone $\frac{0.4}{2}$ or 0.2 or 20% for **B2** Conversion must be correct
6	(a)		C	1		If nothing on answer line look for clear indication in list Allow $\frac{3}{4}\times 14$ on answer line
	(b)		3.5[0]	2	**M1** for $\frac{1}{4}\times 14$ oe	e.g. 0.25 × 14 or 14 ÷ 2 ÷ 2 or 4 × 3.5 = 14 etc but not $\frac{1}{4}$ **of** 14 **M1** for $14-\frac{3}{4}\times 14$ May be seen as 14 – 10.5

Question			Answer	Marks	Part marks and guidance	
7			201 or 201.1 or 201.06 to 201.09	**2**	**M1** for $\pi \times 8^2$ oe	Allow 64π for **2** marks π gives 201.0619... 3.142 gives 201.088 For **M1** π may be evaluated allowing $\frac{22}{7}$ or 3.14 or 3.142
8			96	**4**	**B3** for 19.04 or answer 0.96 or **B2** for 16 OR **M2** for $20 - 1.19 \times$ *their k* or **M1** for figs 2[0] ÷ figs 119 implied by figs 168…	Condone £0.96 for 4 marks *Their k* must be: • from figs 2[0] ÷ figs 119 and • $15 \leq$ *their k* integer ≤ 17 20 ÷ 1.19 may be at least 16 implied additions or subtractions of 1.19

Question			Answer	Marks	Part marks and guidance	
9	(a)		[0]8 34 oe	2	**B1** for 14 [minutes]	Accept any recognisable time format e.g. full stop, colon, gap and inclusion of am but not pm
	(b)		21	3	**FT** *their* time added to 8.20 leading to answer in (a) or stated as cycling time in (a) **B1** for 7 [minutes cycling] or *their* cycle time in (a) ÷ 2 **M1** for *their* cycle time in (a) ÷ 2 + 14	No FT if working not shown in (a) but **if 9.16 is answer in (a)** working does not need to be seen to FT **Example** *Their* time in (a) is 56 then [cycling =] (56 ÷ 2 =) 28 for **B1** [walking =] (28 ÷ 2 =) 14 **M1** for 28 + 14 **3 marks** for answer 42 (check (a) = 9.16 or cycle time = 56) Here 28 ÷ 2 = 14 minutes to walk half the distance Must be correctly evaluated
10	(a)		h^4 final answer	1		Not $h4$ unless 4 **clearly** raised
	(b)		$3g(f + 4)$ final answer	2	**B1** for $3(fg + 4g)$ or $g(3f + 12)$	Allow e.g. 1f and inclusion of × Condone missing final bracket Correct answer seen and then spoilt **B1**
11	(a)		Expression	1		Allow any clear intention e.g. arrow to expression
	(b)		Identity	1		Allow any clear intention e.g. arrow to identity

Question			Answer	Marks	Part marks and guidance	
12	(a)		22 8 23 55 7	3	**FT** *their* 22 – 14 for *their* 8 **B2** for 3 correct or **B1** for 2 correct	
	(b)		Tennis and [R=] 37 or 11 + 12 + 5 + 9 [S=] 20 or 3 + 5 + 5 + *their* 7 [T=] 43 or *their* 8 + 6 + 25 + 4	3	**FT** *their* (a) even if NR **M2** for two from [R=] 37 or 11 + 12 + 5 + 9 [S=] 20 or 3 + 5 + 5 + *their* 7 [T=] 43 or *their* 8 + 6 + 25 + 4 or **M1** for one from [R=] 37 or 11 + 12 + 5 + 9 [S=] 20 or 3 + 5 + 5 + *their* 7 [T=] 43 or *their* 8 + 6 + 25 + 4 If 0 or 1 scored, instead award **SC2** for Tennis = 43 which is 6 more than R and 23 more than S	Accept *their* most popular with **strict FT** from *their* three correct totals for these sports Sums must be correctly evaluated May be on diagram Accept labelled or in correct order Check 13 + *their* 7 Check 35 + *their* 8 If (a) is NR, FT all marks. The values will be: [R=] 11 + 12 + 5 + 9 or 37 [S=] 3 + 5 + 5 or 13 [T=] 6 + 25 + 4 or 35 and the answer R[afting] and the sums or totals seen

Question			Answer	Marks	Part marks and guidance	
	(c)		$\frac{57}{100}$ oe	2	**FT** *their* 22 or 11 + 3 + *their* 8 **B1** for *their* 22 + 35 correctly evaluated or 57 seen If (a) is **NR**, award **SC1** for answer $\frac{35}{100}$ oe or answer $\frac{1}{35}$	Ignore attempts to change form Accept fraction, decimal (e.g. 0.57) and percentage (e.g. 57%) but not ratio nor in words For **B1,** condone $\frac{1}{57}$ as 57 seen
	(d)		[That] these [100] children are representative of all children [who attend the adventure park] oe	1		See Appendix Representative sample

Question			Answer	Marks	Part marks and guidance	
13	(a)		Jane and two correct values in the same form	3	Reminder: mark at most accurate **Method 1** **B2** for 64% and $\frac{5}{8}$ correct in a common form or **B1** for one correct conversion **Method 2** Candidate chooses an integer amount of newspapers **B2** for $\left(64\% \text{ and } \frac{5}{8}\right)$ of *their* amount correct or **B1** for $\left(64\% \text{ or } \frac{5}{8}\right)$ of *their* amount correct If 0 scored, **SC1** for correct judgement for *their* incorrect conversion(s)	Condone 0.62 and 0.63 and 62[%] and 63[%] Sufficient to see just 62.5[%] to make comparison e.g. $\frac{128}{200}$ and $\frac{125}{200}$ or 0.64 and 0.625 Condone bad form e.g $\frac{12.8}{20}$ and $\frac{12.5}{20}$ or 64 and 62.5 or 6.4 and 6.25 e.g. 0.625 or $\frac{125}{200}$ or $\frac{128}{200}$ or 62.5 You will need to check *their* figures Answers can be non-integer e.g. Chooses 70 64% = 44.8 $\frac{5}{8}$ = 43.75 Allow accuracy sufficient to make judgement and condone truncation
	(b)		200	2	**B1** for answer 100 or answer 200*n* with *n* integer > 1	400, 600, ...
14			2.6 <	2	**B1** for each	Do not accept other figures or symbols on line with correct answer Accept trailing zeros

Question			Answer	Marks	Part marks and guidance	
15	(a)		The length is twice the width oe or The width is half the length	1		"Twice" or "double" or "half" is not enough unless it is clear that length = 2 × width Accept 2*k* is double *k* oe or L = 2W oe Do not accept values or length = 2 × *k* Mark the best response as long as it is not contradictory or has an incorrect statement
	(b)		$2k^2 - g^2$ final answer	2	**M1** for $2k \times k - g \times g$ oe	Ignore units if included oe for M1 may be e.g. $2k \times k - g^2$
	(c)	(i)	6*k* final answer	3	**B2** for correct answer unsimplified or **B2** for $6k - 2g$ [+ g + g] or **M2** for $2k + k + 2k - g + k - g$ [+ g + g] oe or **M1** for [height =] $k - g$ or [length =] $2k - g$	Condone $6k + 0[g]$ for 3 marks Accept in any order Accept e.g. $2g$ for $g + g$ Identified or seen on diagram in correct position
		(ii)	10.4 nfww	2	**M1** for *their* **part (i)** = 62.4 or $\frac{62.4}{6}$	*Their* part (i) must be algebraic in terms of *k* or *k* and *g* *Their* (a) can be rearranged Note : $6k - 2g = 62.4$ scores M1 but does not score the second mark as from wrong working

Question			Answer	Marks	Part marks and guidance	
16	(a)		Correct curve through given points	3	**B2** for 6 points correctly plotted or **B1** for 4 points correctly plotted	Half square accuracy. Use overlay as guide For curve: No line segments used Condone **minor** feathering or doubling Max half square vertically or horizontally from any point
	(b)		*their* –1.1 and *their* 2.6	2	Strict **FT** from *their* graph. **B1** for each or ruled $y = 6$ cutting *their* curve twice or points indicated on *their* curve where $y = 6$	Must have graph to score Do not accept coordinates Half square accuracy or better For thick lines mark centre of line Ruled line within half square of $y = 6$ throughout *Their* curve may be a polygon or straight line If intersection at mid-point of small square e.g. –1.15 accept –1.2 or –1.1

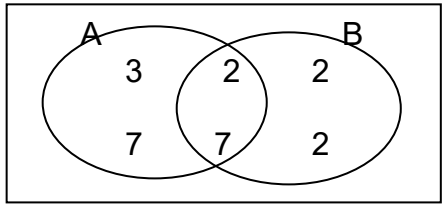
Question	Answer	Marks	Part marks and guidance	
17	2160 with correct working	5	**Method 1** **M3** for $\frac{360}{5 \times 0.04}$ oe may be implied by 1800 or **M2** for $\frac{360}{0.04}$ oe or $\frac{360}{5} \div 4$ or $\frac{360}{4} \div 5$ or **M1** for $\frac{360}{5}$ or $\frac{360}{4}$ or $\frac{P \times 4 \times 5}{100} = 360$ oe AND **M1dep** for *their* 1800 + 360 OR **Method 2 Trials** **M2** for two complete trials bracketing 360 and resulting in 360 ±10 or **M1** for one complete trial ≠ 360 If **0** or **1** scored, instead award **SC2** for 2160 If **0** scored, **SC1** for £1661[.64]	Correct working for 5 marks requires evidence of at least **M2** N/C methods need labels or operators oe 360 = 1800 × 5 × (0.04 or 4 / 100) or $\frac{360}{20}$ × 100 or N/C e.g. 4% = 72, 1% = 18, 100% = 1800 or 20% = 360, 10% = 180, 100% = 1800 or 20% = 360, 360 × 5 = 1800 or or 1 year = 90, 1% = 18, 100% = 1800 NB 360 × 5 = 1800 **alone** scores **M0** May be implied by 9000 or 18 or N/C e.g. 4% = 72, 1% = 18 or 20% = 360, 10% = 180 May be implied by 72 or 90 or N/C e.g. 4% = 72 or 20% = 360 "May be implied" tells you to look for the correct working associated with these values *Their* 1800 dependent on **M3** and not spoiled Trials must show substitution and evaluation e.g. 1850 × 0.04 × 5 oe = 370 1750 × 0.04 × 5 oe = 350 e.g. 500 × 0.04 × 5 oe =100 with no working or insufficient working

Question			Answer	Marks	Part marks and guidance	
18			*BPC* or *CPB* and [vertically] opposite	**B2**	**B1** for *BPC* or *CPB*	Must use 3-letter notation
			DAP or *PAD* *CBP* or *PBC* alternate	**B1**	Must have angle and reason	Condone • *A* and *B* if clear for e.g. *A* for *PAD* and *B* for *CBP* • Changed order e.g. *CBP* and *PAD* • Use of *B* or *C* for *P* e.g. *DAB* for *DAP* For reason, condone poor spelling (alternative) and accept "third angle in triangle" oe
			AAA oe	**B1dep**	Dependent on previous **B2** and **B1**	Accept completely correct statements e.g."All corresponding angles equal" but not "All angles equal" or "They have the same angles" See Appendix
19			Two from: • Horizontal scale uneven • No vertical scale • Vertical scale does not start at 0	**2**	**B1** for each	See Appendix Mark the best part of a statement if no contradiction If more than two reasons (often two in one statement), mark the worst two

Question			Answer	Marks	Part marks and guidance	
20			18 nfww	**3**	**B2** for answer $\frac{18}{99}$ or **M2** for $\frac{2 \times 99}{11}$ oe or **B1** for $\frac{2}{11}$ or **M1** for [k ×] $\frac{99}{11}$ or **M1** for $\frac{a}{b} \times 99$	e.g. $\frac{99}{11} = 9$ and then 2×9 For **B1** accept $\frac{2}{11}$, 0.181 to 0.182 or 18.1% to 18.2% Condone k as 0.5 or 1 or an integer $3 \leq k \leq 10$ Do not imply **M1** from just 9 seen $0 < \frac{a}{b} < 1$ and either $a = 2$ or $b = 11$

Question			Answer	Marks	Part marks and guidance	
21	(a)	(i)	30 nfww	4	**M1** for 5 × 150 implied by 750 [km] **M2** for *their* 750 ÷ (2.5 × 10) oe or **M1** for 2.5 ×10 implied by 25 OR **M1** for 5 × 150 implied by 750 [km] **M2** for *their* 750 ÷ 2.5 ÷ 10 oe or **M1** for *their* 750 ÷ 2.5 implied by 300	Not from 150 ÷ 5 A correct answer in working, subsequently spoilt, scores max **M1M1** *Their* 750 from attempt at 5 ×150 Condone 150 for *their* 750 *Their* 750 from attempt at 5 ×150 Condone 150 for *their* 750
		(ii)	Correct reason indicating roads/paths unlikely to be straight oe	1		See Appendix
	(b)		The units are not the same oe [1 :] 15 000 000	1 1		See Appendix eg should have multiplied by 100 000 or one is cm and the other is km Condone: • poorly placed zero separators e.g. 150, 000, 00 • correct other forms • inclusion of units

Question			Answer	Marks	Part marks and guidance	
22	(a)				Allocate marks similarly for other methods such as five triangles using an angle of 72. If in doubt consult TL There must be evidence of angle or trig work to score any marks e.g. working back from 247.75 to *h* = 8.258…is likely to score 0 or B1	
			[angle =] 36 or 54	**B1**	in correct place if only shown on diagram	Do not award 36 or 54 if calculated as an area
			$[h =]\frac{6}{\tan 36}$ or 6 × tan 54 or $\frac{6sin54}{sin36}$ may be implied by 8.258 to 8.259 or 8.26 following **M1** but **not** from area	**M2**	**M1** for $\tan 36 = \frac{6}{h}$ or $\tan 54 = \frac{h}{6}$ or $\frac{6}{\sin 36} = \frac{h}{\sin 54}$ or $\frac{\sin 36}{6} = \frac{\sin 54}{h}$	Accept other notation for '*h*'
			10 × $\frac{1}{2}$ × 6 × *their h* oe	**M2dep**	**M1** for $\frac{1}{2} \times 6 \times$ *their h* oe may be implied by 24.774 to 24.775	*Their h* **dep** on previous **M2** or **M1** Accept correct use of $\frac{1}{2}ab\sin C$
			247.748 to 247.749	**A1**		
	(b)		5.45 or 5.449 to 5.450 nfww	**3**	**M2** for $h = \frac{450 \times 3}{247.75}$ oe or **M1** for $\frac{1}{3}h \times 247.75 = 450$ oe	247.75 may be *their* more accurate 247.748 to 247.749 or 247.7 247.8 or 247.74 from **(a)** Use of incorrect formula is not **MR**

Question			Answer	Marks	Part marks and guidance	
23	(a)		1176	2	**M1** for $2^3 \times 3 \times 7^2$ oe or for  or for listing at least 3 correct in each list 294, 588, 882, ... AND 56, 112, 168, ...	e.g. $2 \times 2 \times 2 \times 3 \times 7 \times 7$ Accept no box but need to see A and B
	(b)		13 nfww	2	**M1** for [26 =] 2 [×] 13 oe	For **M1** accept 2, 13 or similar possibly seen in a factor tree, diagram etc

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	10% = 8
5% = 4	5% = 5 ✖ condone this slip as answer correct
50% = 40	50% = 40
65% = 52 ✓ M1A1	65% = 52 ✓ M1A1

Method scoring M0A0

10% = 8
5% = 6 ✖ Do not condone this slip as answer incorrect
50% = 40
65% = 54 ✖ **M0**

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 ÷ 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

Appendix

Question **12d**

Assumption	Mark	Reason
All children choose in the same way as these children	**1**	Has the idea of a representative sample
Every group of 100 will chose the same options every time	**1**	BOD does not say “in the same proportion” but implies representative sample
45% of children that weren’t in the 100 would choose football	**1**	Indicates representative sample
That every child that turns up for the adventure park will choose the same options as the 100	**1**	BOD. Does not say “in the same way as the 100” but indicates representative sample
The same proportions apply to all other children coming to the park	**1**	Representative sample
Because 45 is 45% of every 100 children that come to the park	**1**	Representative sample
45%/0.45 of ALL children will choose football	**0**	Repeats question

Examples of methods used for Q17 (There will be more)

When candidates say "4% =" they should mean "4% of the amount invested =" and not "4% of 360 ="
Make a professional judgement if this is correct.
360 × 1.04 or 360 × 0.04 are good indicators of error.

4% of 360 = 14.40 and then 14.40 × 5 = 72 is **wrong method** because they are finding 4% of the interest and not 4% of the original amount.

In the examples below, the M marks are earned by the statement **with those** preceding it. Not just for the statement.
In some methods, **M2** evidence can never seen

360 ÷ 5 (= 72)	**M1**	or	20% = 360	
			4% = 72	**M1**
(72) × 25 = (1800)	**M3**	or	100% = 1800	**M3**

360 ÷ 5 (= 72)	**M1**	or	20% = 360	
			4% = 72	**M1**
(72) ÷ 4 (= 18)	**M2**	or	1% = 18	**M2**
(18) × 100 = (1800)	**M3**	or	100% = 1800	**M3**

360 ÷ 4 (= 90)	**M1**	or	20% = 360	
			1 year = 72	**M1**
(90) ÷ 5 (= 18)	**M2**	or	1% = 18	**M2**
(18) × 100 = (1800)	**M3**	or	100% = 1800	**M3**

360 ÷ 20 (= 18)	**M2**	or	20% = 360	
			1% = 18	**M2**
(18) × 100 = (1800)	**M3**	or	100% = 1800	**M3**

360 ÷ 4 (= 90)	**M1**	or	20% = 360	
			5% = 90	**M1**
(90) ÷ 5 (= 18)	**M2**			
(18) × 100 = (1800)	**M3**	or	100% = 1800	**M3**

360 × 100 = (36000)		or	20% = 360	
(36 000) ÷ 5 = 7200	**M1**		5% = 90	**M1**
			500% = 9000	
(7200) ÷ 4 = 1800	**M3**		100% = 1800	**M3**

Note: the scheme say "May be implied by 72" but, as shown in the example above, 72 can come from wrong method.
72 is a good guide to look for supporting evidence to judge if the figure comes from correct method.

Question **18**

Reason	Mark	Reason
Corresponding [pairs of] angles are equal	**1**	
Matching angles in the triangles are equal	**1**	
They have the same angles	**0**	Not specific enough
All angles equal	**0**	Not true

Question **19**

Reason	Mark	Reason
It doesn't have months for each year. Only a few for 2023	**1**	
There are no numbers on the y axis	**1**	
As it doesn't have all the numbers going up the side of electricity	**1**	
The dates keep skipping from years to months and back again	**1**	
It has months instead of years for 2023	**1**	
Some years have months labelled	**1**	Implies others do not
The x axis dates are uneven distances apart	**1**	Condone x-axis
x-axis goes up by different amounts	**1**	BOD recognising uneven scale
The y-axis doesn't have any data	**1**	BOD means not having any numbers
2023 has four sections but the other years only have one	**1**	Recognises inconsistent scale
The y axis doesn't start from 0	**1**	Condone reference to y axis
8 kWh is very far away from 10 kWh making it look like a big difference where in reality it isn't	**1**	BOD implies "because vertical scale does not start at 0"
The scale of kWh has a large space between 8 and 10	**1**	BOD implies "because vertical scale does not start at 0"
More results for 2023	**1**	Correct because it shows the monthly figures
It misses out a couple of months	**0**	Could be referring to [Jan] Feb, Mar, [April]
The graphs is in months	**0**	Wrong as the graph also has years. Statement doesn't recognise the uneven scale.
The axis doesn't start from 0	**0**	y axis not referenced
On the x axis, there's a fluctuation/jagged line on the line	**0**	
Doesn't show the numbers	**0**	Vertical axis not referenced
The y-axis isn't labelled	**0**	It is labelled but does not have a scale
The graph is on a small scale/ It's not drawn to scale	**0**	Do not accept reference to "drawn to scale"

Question **21a(ii)**

Reason	Mark	Reason
In real life Heidi will not be able to walk in a straight line	**1**	Implies distance increases
Roads aren't straight	**1**	Implies distance increases
She doesn't consider buildings in the way of the straight line distance	**1**	Implies "not a straight line"
The km are estimated as 750 where it is not in real life	**0**	Correct but does not reference using a direct distance
She may have to go a different route	**0**	Doesn't say that the overall distance may be greater (than calculated)
Do not accept		
Average speed is just an estimate	**0**	Do not address error in method of using straight-line distance
Because it's a decimal so doesn't give an exact number of days	**0**	
Because it seems unrealistic	**0**	
She will get tired/slow down/toilet stops	**0**	
There is not enough information	**0**	
Rounded down	**0**	

Question **21b**

Reason	Mark	Reason
Kilometres is not the same as cm	**1**	BOD recognises the different units
Not converting km to cm	**1**	
Not converting to the same units	**1**	"Not converting the units" is not enough
The 1 and 150 aren't both cm	**1**	BOD implies different units
They are in different measurements	**1**	BOD condone "measurements" oe for "units"
He hasn't used units making it seem 1 cm = 150 cm	**1**	BOD the missed out "the same" as explained by the example. The words before 1 cm...are not enough
If it was 1 : 150 then 1 cm would be 1.5 metres	**1**	Shows statement is incorrect
There are 1000 cm in 1 km so he didn't convert	**1**	Incorrect factor but recognises no conversion and does link cm and km implying "between them" (The incorrect factor penalised by wrong 15 000 000)
You can't have two different measurements in the same ratio	**1**	BOD condone "measurements" oe for "units"
It needs to be in cm	**1**	BOD "The ratio" needs to be "all" in cm
He did not convert the km to cm correctly	**1**	BOD references km and cm and conversion
He did not use scale correctly and so has made 150 cm and not 150 km	**1**	BOD Implies not in same units
He wrote it as 1 cm to 150 cm not km	**1**	BOD Implies not in same units
Because cm and km are / are not the same scale	**0**	Incorrect use of scale and the meaning is unclear
He did not convert the units	**0**	Needs to say "to the same units"
He undervalues the 150 km in the ratio	**0**	Doesn't explain how or why
It doesn't show the units so it would be inaccurate	**0**	Doesn't recognise different units

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