F

GCSE (9–1)

Mathematics

J560/03: Paper 3 (Foundation tier)

General Certificate of Secondary Education

Mark Scheme for November 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

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. 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).

9. 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.

10. 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.

11. 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

12. **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.

13. 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.

14. 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.

15. 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.

16. 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).

17. 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'.

18. 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.

19. 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.

20. 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.

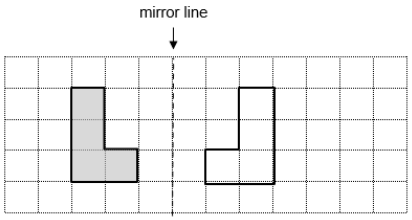
21. When the data of a question is consistently misread in such a way as not to alter the nature or difficulty of the question, please follow the candidate's work and allow follow through for **A** and **B** marks. Deduct 1 mark from any **A** or **B** marks earned and record this by using the **MR** 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.

22. 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.

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

24. 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.

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

Question			Answer	Marks	Part marks and guidance	
1				2	**B1** for correct orientation but wrong location	Mark intention accepting unruled and shaded squares to indicate image
2	a		−20 0.351 10	1		Allow unambiguous transcription errors e.g. 20 but in correct position
	b		300.96	2	**B1** for 304 and 3.04 clearly identified If 0 scored, **SC1** for answer 297.36 or 270 or 266.4 or 30.96 or 3.6	For B1 may be ordered list or e.g. circled in list –300.96 implies B1
3	a		$(5 – 5) \times 5$	1		Condone extra brackets that do not invalidate answer e.g $((5 – 5) \times 5)$
	b		$20 – 5(1 + 3) = 0$	1		If more than one symbol in a space, mark the worst
4			E F	2	**B1** for each	
5	a		32	1		
	b		10	1		
6	a		2 : 5	2	**M1** for 14 : 35 or 4 : 10 or 1 : 2.5 or 0.4 : 1 If 0 scored, **SC1** for answer 5 : 2	Ignore incorrect cancellation once a correct, partially simplified ratio seen Ratio must have colon **and not** "to" or comma

Question			Answer	Marks	Part marks and guidance	
	b		12.5	**2**	**M1** for any correct ratio not 1 : ... or statement 8 cm = 100 cm oe or (figs 10) ÷ 8 or **B1** for answer 1 : 12.5 If 0 scored, **SC1** for answer [0].125	e.g. 8 : 100, 4 : 50 or 2 : 25 or 0.08 : 1
7			24	**3**	**M1** for $1\frac{1}{4}$ and $\frac{1}{2}$ correct in consistent units **M1** for division in correct order between *their* converted $\frac{1}{2}$ and $1\frac{1}{4}$ OR **M1** for $1\frac{1}{4}$ and $\frac{1}{2}$ correct in consistent units **M1** for three correct consecutive/linked terms	**M0 M1** is possible in either method $1\frac{1}{4}$ or $\frac{5}{4}$ or 1.25 and 30; 75 and 1800; $\frac{1}{48}$ and $\frac{1}{2}$ or (0.021 or 0.0208...) and 0.5 Conversions may be incorrect but clearly represent $1\frac{1}{4}$ and $\frac{1}{2}$ e.g. $\frac{1}{2} \div 1.25$ $1\frac{1}{4}$ or $\frac{5}{4}$ or 1.25 and 30; 75 and 1800; $\frac{1}{48}$ and $\frac{1}{2}$ or (0.021 or 0.0208...) and 0.5 e.g. $\left[1\frac{1}{4}, 1\right]$ $2\frac{1}{2}, 2$ $3\frac{3}{4}, 3$ 5, 4 10, 8 20, 16 … or [1m 15s, 1] 2m 30s, 2 3m 45s, 3 …

Question			Answer	Marks	Part marks and guidance	
8	a		16 and 1 or 8 and 2 or 4 and 4 or 1 and 16	2	**M1** for $8 \times 2 = 16$ seen	
	b		3 or 4	2	**B1** for $\left[\frac{1}{5}=\right] 0.2$ and $\left[\frac{1}{2}=\right] 0.5$ or $\left[\frac{1}{5}=\right] \frac{2}{10}$ and $\left[\frac{1}{2}=\right] \frac{5}{10}$ or 0.3 or 0.4 seen	
9	a		[H B C] [H B L] [H F C] H F L H S C H S L V B C V B L V F C V F L V S C V S L	2	**B1** for at least five new correct combinations	For full marks there must be no repeats or extras but condone the three given combinations included and e.g. VB for Veggie Burger etc
	b		$\frac{\textit{their}\ \text{B}}{\textit{their}\ \text{total}}$ isw	1 FT	Strict FT of *their* table including the three given combinations	FT allow repeats and misplaced letters Accept 3 sf answers if decimal or percentage e.g. 0.333[...] or 33.3[...]% If (a) is not attempted, allow $\frac{4}{12}$ or $\frac{2}{6}$ or $\frac{1}{3}$

Question			Answer	Marks	Part marks and guidance	
10	**a**		B and 1.44 is less than 1.5[0] oe or B and ([0].06 or 6p) cheaper oe or B and 1.44 and 1.5[0] seen in final statement	**3**	**M2** for 1.6[0] × 0.9 oe implied by 1.44 or **M1** for 1.6[0] × 0.1 oe implied by [0].16	Allow B and "It's cheaper oe" if only 1.44 [and 1.50] seen in working space Accept all figures in pence May be 1.6[0] – 1.6[0] × 0.1 oe M0 for 10% of 1.6[0] See Appendix B and 3.75 and 4.32 only scores **0** B and 1.44 and 3.75 scores M2 only
	b		A and 3.75 less than 4.32 oe or A and [0].57 saved oe or A and 3.75 and 4.32 seen in final statement OR A and 1.25 less than 1.44 oe or A and 0.19 oe saved or A and 1.25 and 1.44 seen in final statement	**3**	**Method 1** **M1** for 1.5 × 2.5 oe or 3.75 oe **M1** for *their* 1.44 × 3 or (3 × 1.6) × 0.9 oe or 4.32 oe **Method 2** **M2** for 1.5 × 2.5 ÷ 3 oe or 1.25 or **M1** for 1.5 × 2.5 oe or 3.75	Ignore other figures/statements that don't invalidate answer All values may be seen in (a) oe may be 1.5 + 1.5 + 1.5 ÷ 2 Allow "A because it's cheaper" oe if 3.75 and 4.32 only seen as final costs in working space for (b) Allow "A because it's cheaper" oe if 1.25 and 1.44 only seen as final costs in working space for (b)
11	**a**	**i**	37	**1**		
	a	**ii**	5 cao	**2**	**M1** for either step reversed soi	May be seen on diagram eg + 3, ÷ 4, 20 implies 17 + 3 or 17 + 3 ÷ 4 or answer 17.75

Question			Answer	Marks	Part marks and guidance	
	b		$y = 4x - 3$ final answer	**2**	**M1** for final answer $4x - 3$ or $y = 4x + 3$ or $y = kx - 3$ ($k \neq 0$) or $y = 4x - c$ where c > 0 If 0 scored **SC1** for final answer $x = \frac{y+3}{4}$	Accept throughout y on right e.g. $4x - 3 = y$ Accept throughout $x \times 4$ or $x4$ or $x \times k$ etc but not x^4 $y = 4(x - c)$ $4x - 3y$ scores **0** Do not accept arrows e.g. $4 \rightarrow \times x \rightarrow 3 \rightarrow y$
12	**a**		376	**2**	**M1** for 800 – (48 + 80 + 296) or 80 + 296 or 800 × 0.47 oe	
	b	**i**	4	**2**	**M1** for $\frac{n}{40} = 0.1$ or 40×0.1 oe	Answer $\frac{4}{40}$ implies M1 Do not accept $\rightarrow$ for $\times$ M1 for $\frac{80}{800} = \frac{4}{40}$ or $\frac{800}{40} = 20$ and $\frac{80}{20}$
	b	**ii**	Yes oe and large number of trials oe or No and it is an estimate [of the actual number] oe	**1**		If "Yes" must state or imply large sample. Mention of 800 without saying sample is large is not enough. e.g. Yes, they picked lots of times. **1** Yes, they picked 800 times. **0** If "no" must state or imply estimate e.g. No, the relative frequency is only close to the real value **1** No, it's an estimate of probability **0**

Question			Answer	Marks	Part marks and guidance	
13	**a**		6.3[0] cao	**3**	**M2** for $3.78 \times \frac{5}{3}$ oe or **M1** for $\frac{3.78}{3}$ oe may be implied by 1.26	May be in pence 3.78 × (1.66 or 1.67 or 1.66...) May be in pence e.g. 126
	b		10	**2**	**M1** for $\frac{20}{2}$ oe	
14	**a**		13 and 78	**3**	**B2** for answer 13 or 78 in correct place or **M1** for one correct trial of 2 × 3 × prime or a correct factor tree for a number from 70 to 80 or an integer from 70 to 80 ÷ (2 × 3)	Accept 6 for (2 × 3) throughout e.g. 6 × 13 = 78 for 2 × 3 × 13 = 78 e.g. 2 × 3 × 5 = 30 2 × 3 × 7 = 42 2 × 3 × 11 = 66 May be 2 × 3 × 13 = 78 if answer not 13 and 78 Includes 70 and 80 Includes 70 and 80
	b		49	**2**	**B1** for answer 7	Accept 7^2 for 2 marks
15	**a**		"ten thousand[s]" cao	**2**	**B1** for 10 000 seen or answer 10 thousand or answer 10 times a thousand	Accept reasonable spelling Answer Ten to the power 4 scores 0
	b		$3.5 \times 10^{[1]}$	**2**	**B1** for correct answer but not standard form or [0].35 or [100 =] 10^2	For B1 e.g. 0.35×10^2, 35×10^0 etc

Question			Answer	Marks	Part marks and guidance	
16	a		0.2 or 0.19 to 0.20	2	**M1** for $\frac{3.8 \text{ to } 4}{20}$ oe If 0 scored, **SC1** for triangle with incorrect values marked and *their* $\frac{\text{rise}}{\text{run}}$ or $\frac{\text{rise}}{\text{run}}$ with answer in range $0.18 \leq g < 0.19$	e.g. $\frac{1.9 \text{ to } 2}{10}$ e.g. $\frac{13}{20}$ with no triangle scores 0 e.g. $\frac{13}{20}$ with 13 and 20 marked on triangle scores SC1 e.g $\frac{2.1}{11.6}$ and answer 0.181... SC1 Mark for units still available even if wrong gradient
			cm per minute or cm/min	1		
	b	i	5 × *their* gradient	M1	**FT** *their g*radient which is a number	<u>Alternative method</u> **M2** for 25 × (0.19 to 0.2) + 9 with answer that rounds to 14 or **M1** for 25 × *their* gradient + 9 with answer that **does not** round to 14
			13 + *their* 1 giving answer that rounds to 14	M1		
	b	ii	Continues to rise at same rate oe or Rises 0.2 cm every minute oe	1	**FT** *their* gradient if figures quoted	Must imply constant increase [in height] or continued pattern If figures used must be correct or from *their* gradient Accept The pattern continues oe The dough rises consistently oe The dough will rise I cm in 5 minutes

Question			Answer	Marks	Part marks and guidance	
17			8 cao with correct working	4	**M1** for πr^2 [=] $4\pi r$ or πr^2 [=] $2\pi d$ **M1** for cancellation by π implied or factorising e.g. $\pi r(r-4) = 0$ or $r(r-4) = 0$ **A1** for [radius =] 4 [and 0] Trials using πr^2 and $4\pi r$ or πr^2 and $2\pi d$ or πr^2 and $2\pi r$ *or* πr^2 and πd **M2** for two correct trials with $r \neq 4$ or two correct trials with first $r \neq 4$ and then r = 4 or one correct trial with $r = 4$ or **M1** for one correct trial with $r \neq 4$ **A1** for [radius =] 4 If **0** or **M1** scored, instead award **SC2** for answer 8 cao If **0** scored, instead award **SC1** for answer 4 [and 0]	"Correct working" requires evidence of at least M1M1 FT *their* initial statement if possible Accept $\pi r^2 = 4\pi r$ followed by $r^2 = 4r$ as showing cancelling Dependent on M1M1 Must use same value substituted for *r* in both formulas Answers required Dependent on M2 or M1 with no working or insufficient working with no working or insufficient working

Question			Answer	Marks	Part marks and guidance	
18			[x=] 5 and [y =] 4 or (5, 4) seen	**B1**		Must be clearly identified/linked to x and to y May be on graph
			3 × *their* x + [1 ×] *their* y	**M1**		*Their* x and *their* y can be any values linked to x and y Clear substitution required in $3x + y$
			19	**B1**	**FT** *their* (x, y)	Must see working for FT
19			Rotation [centre] (0, 2) 180°	**1** **1** **1**		More than 1 transformation scores 0 A vector alone does not imply translation but does with "and then..." Do not accept turn oe for rotation Condone missing brackets; do not accept $\begin{pmatrix}0\\2\end{pmatrix}$ for (0, 2) Allow if accurate point plotted (½ square) and referred to Ignore direction
20			$\begin{pmatrix}7\\3\end{pmatrix}$	**2**	**M1** for $\overrightarrow{PQ}$ + $\overrightarrow{QR}$ or $\begin{pmatrix}3\\2\end{pmatrix}$ + $\begin{pmatrix}4\\1\end{pmatrix}$ or **B1** for answer $\begin{pmatrix}7\\k\end{pmatrix}$ or $\begin{pmatrix}k\\3\end{pmatrix}$	M1 If fraction line in final answer For M1 allow 3 + 4 and 2 + 1

Question			Answer	Marks	Part marks and guidance	
21			-11 15 with correct working	**3**	**M2** for $(x + 11)(x – 15)$ or **M1** for $(x + a)(x + b)$ where either $ab = –165$ or $a + b = -4$ OR **M2** for 2 correct trials with any number or **M1** for 1 correct trial with any number If **0** scored, **SC1** for –11 and 15 with no working or insufficient working	"correct working" requires **M2** **M2** and **M1** may be implied by grids and other forms such as $x(x – 15) + 11(x – 15)$ Must see substitutions e.g. $5^2 – 4×5 – 165$ <u>Use of formula</u> **M2** for $\frac{[--]4 \pm \sqrt{([-]4)^2 - 4\times[1]\times-165}}{2\ [\times 1]}$ or better e.g. $\frac{4 \pm \sqrt{676}}{2}$ **M1** for formula with at most two errors Do not award if wrong working
22			12	**3**	**B2** for 8 [batches] or **M1** for at least 2 ratios or pairs equivalent to 3:5 or $16 ÷ (5 – 3)$	e.g. 8×1.5 Allow decimals e.g. 1:1.6 to 1.7 or 0.6:1, 6:10, 9:15, 12:20, 15:25, 18:30, 21:35, 24:40, 27:45, ... Does not need ratio symbol
23	**(a)**		0.3 + 0.75 [= 1.05] is greater than 1	**1**		Condone additional statements that do not contradict See appendix Condone 100% for 1

Question			Answer	Marks	Part marks and guidance	
	(b)		Correct tree diagram	**3**	**B1** for P(draw) = 0.15 **B1** for two correctly placed sets of three branches with win/draw/lose labels **B1** for 0.3, *their* 0.15 and 0.55 correctly placed on all required branches	May be on diagram or in a calculation e.g. 0.3+0.55+0.15 = 1 oe Ignore probabilities. Accept e.g. W/D/L as labels Condone omission of *their* 0.15 on printed branches
	(c)		[0].165 oe	**2**	**M1** for [0].3 × [0].55	oe may be $\frac{33}{200}$ or equivalent fraction or 16.5%
24	**(a)**		Positive	**1**		Ignore comments about strength but not that contradict e.g strong positive decrease
	(b)	**(i)**	Clear indication of the point at (27, 25)	**1**		
		(ii)	Hot day [with] few visitors or Outlier	**1**		See Appendix
	(c)		Ruled line of best fit 52 to 78	**B1** **B1**	 If **B0** scored, **FT** *their* ruled line of best fit with positive gradient	Overlay is a guide only; *their* line must be between or through (15, 40) to (17.5, 40) and (22.5, 80) to (25, 80) If more than one line, mark the worst unless one clearly chosen e.g. vertical line from 21 to the line ½ square tolerance

Question			Answer	Marks	Part marks and guidance	
25	(a)		Method must include dimensions (accept 6^2 for 6 × 6 and 6^3 for 6 × 6 × 6 and 12^2 for 12 × 12) 4 × (6 × 12) + 2 × (12 × 12) or 4 × 2 × (6 × 6) + 2 × 4 × (6 × 6) or 8 × (6 × 6) + 8 × (6 × 6) or 4 × 6 × (6 × 6) – 8 × (6 × 6) or 24 × (6 × 6) – 8 × (6 × 6) or 16 × (6 × 6) [=576]	2	**M1** for full method for surface area 4 × 72 + 2 × 144 or 4 × 2 × 36 + 2 × 4 × 36 or 8 × 36 + 8 × 36 24 × 36 – 8 × 36 oe or 16 × 36	Brackets do not need to be shown **0** for 288 + 288 864 – 288 4 × 6 × 4 × 6 24 × 24

Question			Answer	Marks	Part marks and guidance	
	(b)		12.5 nfww	**4**	**M2** for (2 × 6 × 6) + (4 × 6 × 24) oe or **M1** for calculating the surface area of one or more faces of the cuboid AND **M1** for $\frac{their\ 648}{576}[\times 100]$ oe or $\frac{(their\ 648) - 576}{576}[\times 100]$ oe <u>Alternative method</u> **M2** for 16 and 18 [exposed faces] or **M1** for 16 or 18 [exposed faces] AND **M1** for $\frac{their\ 18}{their\ 16}[\times 100]$ or $\frac{their\ 18 - their\ 16}{their\ 16}[\times 100]$	soi by 72 + 576 or 648 e.g. 6 × 6 soi by 36 6 × 24 soi by 144 *Their* 648 from attempt at surface area involving 6 × (6 or 24) soi by 1.125 or 112.5 soi by 0.125 oe may be $\frac{72}{576}$ [× 100] soi by 1.125 or 112.5 soi by 0.125

Question			Answer	Marks	Part marks and guidance	
26			57.5	**4**	**M2** for $\frac{7\times 25}{10}$ oe soi by 17.5 or **M1** for 25 ÷ 10 or 10 ÷ 25 or 7 ÷ 10 or 10 ÷ 7 AND **M1** for 15 + 25 + *their* 17.5	Evidence may be seen on diagram Implied by 2.5 or 0.4 or 0.7 or 1.4... *their* 17.5 from *their* valid attempt using scale factors to find *AB*

Appendix for 10a

Working and answer	Mark	Reason
3.75 and 4.32 seen in working Answer: B it is cheaper because 1.44 is cheaper than 1.5	**3**	Answer uses correct figures
1.44 only seen in working Answer: B it costs less	**3**	There can be no other figure to compare with so all marks awarded
1.44, 3.75 and 4.32 seen in working Answer: B He only wants one packet so it is cheaper	**M2**	M2 for 1.44 but no comparison
1.44 and 3.75 seen in working Answer: B even when you buy 2 packets it is cheaper than A	**M2**	M2 for 1.44 but no comparison
Answer: B and 1.44 cheaper than 3.75	**M2**	Answer based on incorrect figures but 1.44 seen
16p found and 3.75 seen Answer: B and 3.59 cheaper	**M1**	16p seen but 3.59 comes from 3.75 – 0.16 so incorrect values. M1 as 16p used
Answer: B and 3.75 lower than 4.32	**0**	Answer based on incorrect values

Question 23a

Comment	**Mark**	Reason
0.3 + 0.75 add to greater than 1	**1**	
They add to greater than 1	**1**	Allow “they” or “the probabilities” etc for 0.3 and 0.75 (1.05 does not need to be seen)
0.3 + 0.75 = 1.05 which is more than 1. The probability of winning + losing should equal 1.	**1**	Winning + losing should ≤ 1 but does not contradict required evidence
Probabilities add up to 1 and 0.3 + 0.75 = 1.05 which is beyond 1	**1**	First vague words do not contradict required evidence
0.3 + 0.75 = 1.05 and probability only goes to 1	**1**	BOD “only goes to” as meaning “cannot be greater than”
The probabilities should add to 1 but instead 1.05 which isn’t possible	**0**	“Which isn’t possible” not enough without > 1
0.3 + 0.75 = 1.05 so they cannot both be correct	**0**	True but doesn’t say why they cannot both be correct (0.3 + 0.75 > 1)
Probabilities must add to 1 or less	**0**	True general statement but not related it to this context
They must add up to less than 1	**0**	Incorrect, they could also add up to 1 but have not mentioned adding to > 1
They must add up to 1	**0**	Incorrect, they could also add up to less than 1 but have not mentioned adding to > 1
0.3 + 0.75 = 1.05 and it needs to be a whole number	**0**	Sum is correct but reason does not say more than 1
They cannot be right because probabilities must add to 1 which they don’t	**0**	Probabilities do not always add to 1 and the required evidence is not given

There were not many visitors even though it was a warm day	**1**	
There were not many visitors because of the storm	**1**	BOD “storm” in place of hot
High temperature but less visitors	**1**	
It’s 27˚, a hot temperature, yet there are less than 40 visitors	**1**	Implies low number of visitors
It’s 27˚ and there were only 25 visitors	**1**	BOD 27 meaning “hot” and 25 implies low number of visitors
Because the temperature is high but attendance is lower than normal	**1**	Allow lower than normal for low
As there wasn’t alot of people but on other hot days there was alot of people	**1**	Acceptable: high temperature low visitors
It was hot but not many people	**1**	Accept hot and implying low people numbers
Because it’s hot however as it was stormy I don’t think that many people would have gone	**1**	BOD Hot and not many people and allow “not many would have”
Outlier	**1**	
Anomaly	**1**	BOD equivalence to “outlier”
Not many visitors	**0**	Insufficient. There are other occasions when there are not many visitors does not mention heat
Because it was really hot	**0**	Insufficient. No mention of low number of visitors
It does not correspond to the correlation	**0**	Does not mention heat or visitor numbers
It does not fit with the rest of the points	**0**	Does not mention heat or visitor numbers
It is away from the correlation line	**0**	Does not mention heat or visitor numbers
It doesn’t follow the increasing trend	**0**	Does not mention heat or visitor numbers

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