OCR
Oxford Cambridge and RSA

Higher

GCSE

Mathematics - Paper 4

J560/04: Paper 4 (Higher 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.

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	(a)		6.05×10^6	1		Condone extra zeros and notation such as 6.05×10^{06} and $6.05 \cdot 10^6$ but not $6.05^{\times 10^6}$ or 6.05^{06}
	(b)		[0].00458	1		Condone extra zeros
2			29.575	2	**M1** for 43.2 or $\frac{216}{5}$ or 13.625 or $\frac{109}{8}$ oe	Condone for **2** marks $\frac{1183}{40}$ or $29\frac{23}{40}$
3			1640 with correct working	5	**B1** for 1.05 or 1.1025 oe **M2** for $\frac{17640}{1.05^2}$ or $\frac{17640}{1.1025}$ oe or **M1** for $\frac{17640}{1.05}$ oe or $n \times 1.05^k = 17\,640$ (k =1 or 2 or 3) Trials We need value and its result for **M1** **M1** for each correct trial up to a maximum of **M3** **M1** for 17 640 − their 16 000 If **0, 1** or **2** scored instead award **SC3** for answer 1640 with no working or insufficient working	"correct working" requires at least **B1 M1** if trials used **M1 M1** **B1** equiv. includes e.g. $\frac{105}{100}$ and 105% **M2** implied by 16 000 **M1** implied by 16 800 . can be implied by answer and their 16 000 must be less than 17 640

Question			Answer	Marks	Part marks and guidance	
4			10 with correct working	6		"correct working" requires at least **M1M1** or **M2**
					M2 for a correct method to find the interior angle of a pentagon e.g. 180 – $\frac{360}{5}$ or $\frac{(5-2)\times180}{5}$	**M2** implied by 108
					or **M1** for partial method e.g. $\frac{360}{5}$ or (5 – 2) × 180	**M1** implied by 72 or 540
					AND	
					M1 for 360 – 2 × their 108	**M3** implied by 144
					AND	
					M2 for $\frac{360}{180-their144}$	
					or **M1** for 180−their 144	**M1** for (n – 2)180 = their144n oe and **M1** for a correct rearrangement e.g. 36n = 360
						<u>Alternative method</u> as the third angle is the sum of the two exteriors of the pentagons
					If **0**, **1** or **2** scored, instead award **SC3** for answer 10 with no working or insufficient working	**M3** for $2 \times \frac{360}{5}$ [= 144] or **M1** for $\frac{360}{5}$ and **M2** for $\frac{360}{360-their144-180}$ oe or **M1** for 360 – their 144 – 180 oe

Question			Answer	Marks	Part marks and guidance	
5	(a)		2 points accurately plotted	2	**B1** for each	tolerance ± $\frac{1}{2}$ small square radially and ignore other plotted points
	(b)		Negative	1		Ignore embellishments
	(c)		ruled straight line of best fit 5 − 6.5	B1 B1	If **B0 FT** their ruled straight line of best fit with negative gradient and meeting both 500 and 1500	Overlay is a guide only, their line must be between or through (500, 8) to (500, 10) and (1500, 1) to (1500, 3) and meeting both 500 and 1500 lines
	(d)		(1200, 9.2) indicated	1		Ignore points indicated as answers for parts (a), (c) and (f)
	(e)		Accept any correct explanation	1		see appendix
	(f)		40	3	**B1** for 6 if **2** not scored in **(a) FT** their diagram **M1** for $\frac{6 \text{ or their } 6}{15 \text{ or their} 15}$ [× 100] **M1** for correctly converting their fraction to a percentage (less than 100%) rounded or truncated	for **B1 FT** their diagram must not include a point for part **(c)** for **M1** their 6 is their number of points under 6°C their 15 is the total number of **plotted** points (may include one for **(c)**) e.g. $\frac{7}{15}$ = 46 or 47 or 46.6 to 46.7

Question			Answer	Marks	Part marks and guidance	
6	(a)		122	4	**B3** for 121.5[…] leading to an answer 121[.5…] or 1215.2[…] leading to an answer 1215 or 12.15[…] leading to an answer 12 OR **M3** for $\frac{3.5\times1000\times100}{2\times60\times24}$ oe OR **M1** for correct time conversion to a day e.g. [2×] 60×24 and **M1** for one distance km to cm or one distance cm to km or two distances to metres and **M1** for distance divided by rate e.g. $\frac{3.5\times100\times100}{2\times60\times24}$ to a maximum of **M2**	ignore any units throughout e.g. 3500 ÷ 28.8 **M1 M1** may be implied by 0.0288 **M1** may be implied by e.g. 1440 or 14.4 or 0.0144 or 2880 or 28.8 **M1** may be implied by e.g. 0.02 **and** 28.8 or 3500 **and** (0.02 or 28.8) or 0.000 02 or 350 000 **M1** may be implied by e.g. $\frac{figs35}{figs288}$ or $\frac{3.5\times1000\times100}{2\times60\times60\times24}$ or figs 175
	(b)		It will take less time [than their 122 days]	1		accept any correct explanation (see appendix) and select best comment if more than one providing they do not conflict

Question			Answer	Marks	Part marks and guidance	
7			5.73 to 5.74 or 5.7 with correct working	5	**M4** for [r^3 =] $\frac{1}{3} \times 12.3^2 \times 15.7 \div \frac{4}{3}\pi$ oe or for [r^3 =] their 791.8 $\div \frac{4}{3}\pi$ OR **M3** for $\frac{4}{3}\pi r^3 = (\frac{1}{3} \times 12.3^2 \times 15.7)$ oe or $\frac{4}{3}\pi r^3$ = their 791.8 OR **M1** for $\frac{1}{3} \times 12.3^2 \times 15.7$ oe **A1** for 791.7 to 791.8 or 792 <u>Trials</u> We need value and its result for **M1** **M1** for $\frac{1}{3} \times 12.3^2 \times 15.7$ oe **A1** for 791.7 to 791.8 or 792 **M1** for a correct trial **M1** for another correct trial If **0**, **1** or **2** scored instead award **SC3** for answer 5.73 to 5.74 or 5.7 with no working or insufficient working If **0** or **1** scored instead award **SC2** for 188.99 to 189.03 with no working or insufficient working If **0** scored **SC1** for 791.7 to 791.8 or 792 with no working or insufficient working	"correct working" requires at least **M3** or if trials are used **M1 M1 M1** Notes: allow 151[.29] or 151.2 or 151.3 for 12.3^2, for $\frac{1}{3}$ accept 0.33 or better and for $\frac{4}{3}$ accept 1.33 or better and for $\frac{4}{3}\pi$ accept 4.17 to 4.19 their 791.8 is 791.7 to 791.8 or 792 or from correct use of given formula **M3** implied by V = $\frac{4}{3}\pi r^3$ and V = their 791.8 do not lose **M1 A1** if further work on a sphere does not include this

Question			Answer	Marks	Part marks and guidance	
8	(a)		accurate curve	3	**B2** for 6 or 7 points accurately plotted or **B1** for 4 or 5 points accurately plotted	tolerance $\pm\frac{1}{2}$ small square radially for curve and points, condone a wobbly curve and slight feathering or tram lines in no more than 3 sections but no ruled lines
	(b)		x = −1 oe	1		
	(c)		−2.8 or −2.7 0.7 or 0.8	2	**B1** for either If **0** or **1** scored **FT** their curve for **1** or **2** marks or **SC1** for an answer in each of −2.8 to −2.7 and 0.7 to 0.8	tolerance $\pm\frac{1}{2}$ small square radially
9			23.2 to 23.25… with correct working	5	**M2** for $\sqrt{3.7^2 + 6.4^2}$ or **M1** for $3.7^2 + 6.4^2$ and **M2** for π × their 7.39…oe or **M1** for 2 × π × their 7.39… or π × their 7.39… × $\frac{1}{2}$ If **0** or **1** scored award **SC2** for answer 23.2 to 23.25 with no working or insufficient working	"correct working" requires at least **M1** and **M1** or **M2** from use of Pythagoras' theorem or full and correct method using trigonometry **M2** implied by 7.39… their 7.39 includes 54.65 or $\frac{1093}{20}$

Question			Answer	Marks	Part marks and guidance	
10	(a)		Any correct criticism e.g. small sample sample not random as many in the population cannot be in the sample i.e. they may be at work no control over the number of adults and children	3	**B1** for each	Question asks for criticisms so criteria is : i.e larger sample size i.e not randomly selected as some are excluded i.e reasonable proportions of adults and children do not allow a repeated point
	(b)		overlapping groups oe or there is no option for over 20h	1		e.g where does 2 go? select best comment
11			42.5 or 42.49[9..] ÷ 1.75	M3	**B1** for 1.75 **B1** for 42.5 or 42.49[9…]	**B1** seen anywhere and mark figures crossed out if you think they have been “rejected” for use
			25	A1	If **0** scored award **B3** for 24.29 or 24.28[5…] or if **0** or **1** scored award **SC1** as well for their 24.29 seen and correctly rounded up	
12	(a)		53 alternate segment [theorem]	1 1		 condone ‘rule’ for ‘theorem’

Question			Answer	Marks	Part marks and guidance	
	(b)		38 with correct working	**5**	**B1** for OGH = 52 **B1** for JHG = 26 **B2** for [OGJ =] 64 or **M1** for 180 – 52 [÷2] If **0** or **1** scored award **SC2** for answer 38 with no working or insufficient working Note: If answer is 38 and the working is incorrect only award the **B** marks.	"correct working" requires at least **B2** or **B1B1** angles may be on diagram Alt. 1: **B1** for JHG = 26 **B1** for OJH = 26 **B2** for [OJG =] 64 Alt.2: **B1** for tangent at G **B1** for OGH = 52 **M2** for 90 ─ 52
13	**(a)**		280	**2**	**M1** for 5 × 8 × 7 or 5 × 56 or 40 × 7 or 35 × 8 If **0** scored **SC1** for 6 × 8 × 7	Condone for **M1** e.g. $\frac{12}{280}$
	(b)		$\frac{12}{280}$ oe	**2**	**M1** for 2 × 3 × 2 or 12 or $\frac{2}{5}\times\frac{3}{8}\times\frac{2}{7}$ **FT** 280 from their answer to **(a)** for **2** marks i.e $\frac{12}{their\ 280}$ If **0** scored **SC2** for $\frac{18}{336}$	Equivs. include $\frac{6}{140}$, $\frac{3}{70}$, 0.043, 0.0429, 0.04286 and 0.04285… and allow percentages with sign e.g 4.3%, isw changing form after correct answer seen
14			[a =] −5 [b =] 2	**2**	**B1** for one correct or **M1** for any pair of original brackets correctly expanded e.g. $3x^2+ax+6x+2a$ or $1[x]\times 3[x]\times b[x]=6[x^3]$ or $2\times a\times 3=-30$ or better	allow seen in a table

Question			Answer	Marks	Part marks and guidance	
15			accept any correct method e.g. (2n + 1)(2m + 1) e.g. 4nm + 2n + 2m + 1 or 4nm + 2(n + m) + 1 Statement showing that the expression is odd e.g. first three terms are even and add 1 to an even gives odd	**M1** **M2** **A1**	accept any letters condone poor use of brackets throughout if the terms are correct correctly expanding their brackets **M1** for any three terms out of the four correct (middle term of three counts as two terms) e.g. 2(2nm + n + m) + 1 and a short statement "even + odd = odd" **A1** dep. on two method marks If **0** scored award **SC1** for 2n + 1 etc seen or for the correct expansion of any two brackets including e.g. x(x + 1)	for **M1** accept e.g. (2n + 1)(2m + 1) without any explanation BUT only accept e.g. (x + 1) (x + 3) if they state that x is even for **M1** and **M2** only accept brackets that **could** be the product of two odd numbers e.g. **M2** for x^2 + [1]x + 3x + 3 or better **A1** for statement showing expression is odd e.g. x is even so x^2 and 4x are even so +3 makes odd
16	**(a)**		1.035 is greater than 1 oe	**1**		
	(b)		3.5	**1**		
	(c)		185 000	**1**		
	(d)		212 300	**2**	**M1** for 185 000 × 1.035^4 soi 212 291[. …] If **0** scored **B1** for their answer to more than 4 figs correctly rounded to 4 s.f.	
	(e)	**(i)**	any correct method, e.g. 368 110[. …] or 368 111 380 994[. …] or 380 995	**2** **1**	**M1** for 185 000 × 1.035^{20}	Alternate method 1 e.g. 1.035^{20} = 1.98 to 1.99 scores **2** 1.035^{21} = 2.05 to 2.06 scores **1** Alternate method 2 184 055 to 184 056 for **2** marks 190 497 to 190 498 for **1** mark
		(ii)	any correct explanation e.g. the rate of increase may not continue	**1**		see appendix

Question			Answer	Marks	Part marks and guidance	
17			$\frac{100}{210}$ oe	4	**B1** for $\frac{9}{14}$ or $\frac{5}{14}$ or $\frac{10}{14}$ or $\frac{4}{14}$ **M1** for $\frac{10}{15} \times \frac{5}{14}$ or $\frac{5}{15} \times \frac{10}{14}$ or $\frac{50}{210}$ oe **M1** for 2 × their $\frac{50}{210}$ oe (must be 2× a product) If **0** scored allow **SC2** for answer $\frac{100}{225}$ oe or **SC1** for answer $\frac{50}{225}$ oe	May be on a diagram or in a calculation Common equivalents for **4** marks include $\frac{10}{21}$ or 0.476… or 47.6…%, condone 0.48 with evidence of some correct working Alt. method **B1** as in mark scheme **M1** for $\frac{10}{15} \times \frac{9}{14} + \frac{5}{15} \times \frac{4}{14}$ or $\frac{110}{210}$ oe **M1** for $1 - \frac{110}{210}$ oe equivs. e.g. $\frac{20}{45}$, $\frac{4}{9}$, 0.444.., 44.4..% equivs. e.g. $\frac{10}{45}$, $\frac{2}{9}$, 0.222.., 22.2..%
18			$x^2 + y^2 = 3^2$ oe final answer	2	**B1** for $x^2 + y^2 = k$ (not 9)	k could be r^2
19	(a)		$\frac{4-6n}{(2n+3)(n^2+1)}$ final answer	4	**M1** for consistent common denominator of $(2n + 3)(n^2 + 1)$ **M1** for $4(n^2 + 1) – 2n(2n + 3)$ **M1** for correct expansion of one bracket	Condone $\frac{4-6n}{2n^3+3n^2+2n+3}$ for **4** marks and allow numerator 2(2 – 3n) allow e.g. $\frac{4(n^2+1)}{(2n+3)(n^2+1)} - \frac{2n(2n+3)}{(2n+3)(n^2+1)}$ Condone brackets crossed out
	(b)		$\frac{x+3}{2x+5}$ final answer	5	**M2** for (x + 3)(x – 4) or **M1** for brackets which give 2 correct terms **M2** for (2x + 5)(x – 4) or **M1** for brackets which give 2 correct terms	Condone brackets crossed out

Question			Answer	Marks	Part marks and guidance	
20			{x : −6 ≤ x ≤ 2} final answer and with correct working	**5**		"correct working" requires at least **M2** e.g. (x + 6)(x – 2)
					B4 for −6 ≤ x ≤ 2 with correct working and not written separately OR	
					M2 for (x + 6)(x – 2) or $\frac{-4\pm\sqrt{4^2-4\times1\times-12}}{2}$ or **M1** for brackets which give two correct terms or the formula with at most two errors	condone x(x – 2) + 6(x – 2) for **M2** could be seen as roots on a sketch of graph or with incorrect inequality symbols <u>completing the square</u> : allow $(x+2)^2-16$ for **M2** or $(x+2)^2+k$ for **M1**
					B1 −6 and 2	**.**
					If **0** or **1** scored award instead **SC2** for {x : −6 ≤ x ≤ 2} If **0** scored **SC1** for −6 ≤ x ≤ 2	

APPENDIX

Exemplar responses for Q5(e)

Response	Mark
It is too far away from the last piece of data	**1**
the recordings haven't been taken since 1580m it would need another recording after 1800 to average	**1**
the last temperature recorded near 1800 is 1580	**1**
there isn't a temperature for 1700 so it suggests the experiment **ended at 1580**	**1**
it could be **below 0**	**1**
in the scatter diagram it doesn't go over 1600 m	**1**
the data does not go up to that height	**1**
you do not have measurements for surrounding heights	**1**
graph only goes up to 1580	**1**
answer would be **negative**	**1**
the reading goes **off the graph**	**1**
extrapolation goes beyond known data/1580	**1**
the line of best fit would be off the graph	**1**
no values for temperatures under zero	**1**
the LOBF does not reach there	**0**
answer is not on the scale	**0**
the pattern may change when the temperature goes below zero	**0**
there isn't a temperature for 1700 so it suggests that's where the experiment ended	**0**
there is no information/data at that point	**0**
because it's the last height and where the graph stops	**0**
its an estimate	**0**
there is no data	**0**
no points plotted at 1800	**0**
there are no results of temperature for this given height 1800	**0**
extrapolation (alone)	**0**
there isn't enough evidence	**0**
there are no calculations on that day	**0**
there is no more temperature decrease after 1580	**0**

Exemplar responses for Q6(b)

Response	Mark
it will take less time [than their 122 days]	**1**
my answer to part (a) will decrease	**1**
it will take longer on some parts and less time on other parts	**0**
it will increase	**0**
it will change the time	**0**
it will not affect my answer	**0**
it will take 4 days not 5 days (incorrect statement)	**0**
it make it faster to dig the tunnel	**0**

Exemplar responses for Q10(a)

	Response	Mark
small size	small sample (condone use of 'population')	1
	only collect from 25 people	1
	need a larger sample size	1
	bias introduced as many are at work/school so not in sample	1
not random	only collect on one day/ should collect on many days/ collect at different times/collect at different places	1BOD
People are excluded	mostly older people on the street at that time	1
	test is random so it is biased/unfair	1BOD
	many people work on Monday morning	1
	data collected from one set of people	1
	all children at school so not in sample	1
	only interviewing people from the same area	1
	people in the High Street don't exercise	0
	don't know if people tell the truth	0
	some people would have been out before 11 am	0
No control over strata	no control over number of adults and children	1
	might be all/many adults	1
	might be no children in the sample as all at school	1
	needs to be 'enough' adults and 'enough' children in sample	1
	number of adults and children not equal/must be equal	1BOD
	they should interview the same amount of children and adults	1BOD
	there may be an uneven number of adults and children	1BOD
	children are at school so they will interview more adults	1

Exemplar responses for Q16a

Response	Mark
1.035 is above 1	**1**
the percentage multiplier is above 1	**1**
it is being multiplied by a number greater than 1	**1**
the rate is above 1	**1**
the multiplier is higher than 1	**1**
103.5 means 103.5% and that means 3.5% is **added** each year	**1(BOD)**
103.5% is an increase **add on** to 100	**1(BOD)**
it is above 1	**1**
the number is multiplied by 1 and 3.5%	**1(BOD)**
the multiplier starts with a 1	**0**
it is being added to 100%	**0**
the multiplier is positive	**0**
the multiplier is 1.035	**0**

Exemplar responses for Q16(e)(ii)

Response	Mark
the rate of increase may not continue	**1**
house prices fluctuate	**1**
they could drop	**1**
‘something’ may cause the price to drop (e.g. damage, inflation, local flooding, financial crisis or Brexit)	**1**
they may increase at different rates	**1**
the house may be demolished	**1**
accept any home improvement e.g. extension (might increase faster than predicted)	**1**
it is only an estimate	**0**
it is only a prediction	**0**
house market may have changed	**0**

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