OCR
Oxford Cambridge and RSA

Higher

GCSE

Mathematics - Paper 4

J560/04: Paper 4 (Higher tier)

General Certificate of Secondary Education

Mark Scheme for November 2023

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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

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

Annotation	Meaning
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			9.5	3	**M2** for $\frac{262.80}{240}$ or $\frac{262.80-240}{240}$ oe OR **M1** for 262.80 – 240 or 22.80	implied by 0.095, 1.095 or 109.5
2	**(a)**		it has only one factor	1		Accept any correct reason see appendix if more than one statement mark the best as long as it is not contradicted or has an incorrect statement
	(b)		1, a, b, ab, a^2, a^2b	2	**B1** for at least 3 correct	Ignore repetitions, maximum of 6 values, if more than 6 apply choice, condone e.g $a \times a$, $a \times b$
3	**(a)**		a correct labelled pie chart with ruled lines	4	**B3** for a correct unlabelled/incorrectly labelled pie chart with ruled lines OR **B2** for 162, 90 and 108 or for two sectors within tolerance of ± 2° ignore label or **M1** for $\frac{360}{40}$ or 9 OR **B1** for one sector within tolerance ignore label	Correct means three sectors within tolerance of ± 2° for **B3** and **4** marks Do not accept frequency alone as labels May be seen in working, alongside table or on pie chart Note : maximum of 3 sectors for **B3, B2** and **B1**
	(b)		The pie charts do not show how many matches were played by each team	1		Accept any correct reason see appendix if more than one statement mark the best as long as it is not contradicted or has an incorrect statement

Question			Answer	Marks	Part marks and guidance	
4	(a)		4	1		
	(b)		23:04 or 11 04 pm	4	**B3** for 64[m] or 1[h] 4[m] or **M3** for $\frac{48}{45} \times 60$ oe or **M2** for $\frac{48}{45}$ implied by 1.06 to 1.07 or $1\frac{1}{15}$ or $\frac{3}{45} \times 60$ oe implied by 4 or **M1** for $\frac{k}{45}$	Not 11 04 [am] or 11h 4[m]
5	(a)		$1000x$ oe or x kg = $1000x$ oe	1		Accept e.g. $1000 \times x$ or $x1000$ or $x \times 1000$ Do not allow e.g. $x = 1000x$ or $w = x1000$ Ignore units e.g. k and g
	(b)		$\frac{y}{10\,000}$ oe or y cm^2 = $\frac{y}{10\,000}$ oe	1		Allow e.g. $\frac{y}{100^2}$ or $0.0001y$ or $y \times 10^{-4}$ or $y \div 10\,000$ or $0.0001 \times y$ or $\frac{1}{10000}y$ Ignore units e.g. m and cm

Question			Answer	Marks	Part marks and guidance	
6			[carrots =] 1.23 [potatoes =] 0.78 with correct working	5	**B4** for one correct answer with correct working OR **M1** for $2c + 5p = 6.36$ oe **M1** for $3c + 2p = 5.25$ oe **M1** for correct method to equate coefficients of one variable allowing one arithmetic error **M1** for correct method to eliminate one variable allowing one arithmetic error If **0** or **M1** scored award **SC2** for answers 1.23 and 0.78 with no working or insufficient working or if **0** scored **SC1** for two answers which satisfy one of the original conditions	"Correct working" requires evidence of at least **M1 M1 M1** Allow any letter for *c* and *p*, but not carrots or potatoes, and working in pence, answers in pence must have 'p' after, condone £ or pence in equations e.g. $6c+15p = 19.08$ and $6c+4p = 10.50$ or $4c+10p = 12.72$ and $15c+10p = 26.25$ e.g. $11p = 8.58$ or $11c = 13.53$ Note: A sign error is not an arithmetic error if substitution method used **M1** for correctly rearranging equation **M1** for correct substitution into other equation Correct answers from trial and improvement scores **5**
7			−3 −2 −1 0 1 2	3	**B2** for 5 correct and none incorrect or 6 correct and 1 incorrect OR **M1** for $-10 - 2 < 3x$ or better **M1** for $3x \leq 8 - 2$ or better If **0** scored **SC1** for $x = -4$ and $x = 2$	e.g. $\frac{-12}{3} < x$ or $-4 < x$ e.g. $x \leq \frac{6}{3}$ or $x \leq 2$

Question			Answer	Marks	Part marks and guidance	
8	(a)		C	1		
	(b)		E	1		
9	(a)		Expanding the brackets gives $-x$ oe $(x - 4)(x + 5)$	1 1		Accept any correct response, look for answers in the working space (see appendix)
	(b)		The third line should be $2 - 5$ $3x = 2 - 5$ $3x = -3$ $x = -1$	1 1		Accept any correct response, look for answers in the working space (see appendix)
10			4242 with correct working	6	**M2** for $\sqrt{42.5^2 - 20^2}$ or **M1** for $[...]^2 + 20^2 = 42.5^2$ or **B1** for 20 Accept any correct method for the area e.g. **M1** for (48 + *their* 37.5) × 54 or 4617 **M1** for $\frac{1}{2} \times$ *their* 37.5×20 or 375 **M1** for *their* 4617 – *their* 375 If **0**, **1** or **2** marks scored instead award **SC3** for answer 4242 with no or insufficient working If **0** or **M1** scored instead award **SC2** for 37.5 with no or insufficient working	"Correct working" requires evidence of either **M2** or **M1 M1** **M2** implied by 37.5 Alternative for area e.g. : **M1** for 48 × 54 implied by 2592 **M1** for $\frac{1}{2} \times (54 + 34) \times$ *their* 37.5 implied by 1650 **M1** for *their* 2592 + *their*1650 OR **M1** for 48 × 54 implied by 2592 **M1** for $34 \times$ *their* $37.5 + \frac{1}{2} \times$ *their* 37.5×20 implied by 1275 + 375 **M1** for *their* 2592 + *their 12*75 + *their 3*75 i.e adding all *their* areas together Note : **M1 M1 M1** for the area requires a correct method

Question			Answer	Marks	Part marks and guidance	
11			27 with correct working	5	**M2** for [56 =] 2×2×2×7 oe or better and [64 =] 2×2×2×2×2×2 oe or better or listing the correct multiples of 56 and 64 up to 448 or **M1** for [56 =] 2×2×2 × 7 or better or [64 =] 2×2×2×2×2×2 or listing the next 3 correct multiples of each or one complete list or [LCM =] 448*k* (*k* = 2,3,4 …) **A1** for 448 or $2^6 \times 7$ oe e.g 8 × 8 × 7 and **M1** for 12 463 ÷ *their* 448 If **0, 1** or **2** scored, instead award **SC3** for answer 27 with no working or insufficient working If **0** or **1** scored, instead award **SC2** for answer 27.8… with no working or insufficient working If **0** scored, instead award **SC1** for answer 448 with no working or insufficient working	"Correct working" requires evidence of at least either **M2** or **M1 M1** Allow factors in e.g. factor trees or tables and allow for **M2** any correct complete method e.g. [56=] 8 x 7 and [64=] 8 x 8 or multiples of 56 up to 448 **and** some indication of dividing these numbers by 64 or with multiples of 64 and dividing by 56 multiples of 56 and 64 are 112, 168, 224, 280, 336, 392, 448 and 128, 192, 256, 320, 384, 448 You might see this: | | 56 | 64 | | 2 | 28 | 32 | | 2 | 14 | 16 | | 2 | 7 | 8 | **M1** may be implied by 27.8… Alternative method : **M2** for an attempt at $\frac{12463}{56} - \frac{12463}{64}$ or **M1** for an attempt at $\frac{12463}{56}$ and an attempt at $\frac{12463}{64}$ AND **B2** for 27.8…. or **B1** for 27 < *their* 27.8 ≤ 28

Question			Answer	Marks	Part marks and guidance	
12	(a)		0.4 and 0.6 oe on the correct branches	3	**B1** for 0.4 or 0.6 oe **M1** for 0.4 and 0.6 on first branch or on all second branches in the correct places If **0** scored **SC1** for two probabilities consistently placed and adding to 1	Accept equivalent fractions $\frac{2}{5}$ and $\frac{3}{5}$
	(b)		0.64 or $\frac{16}{25}$ oe	3	**FT** for **M1** and **M2** and **3** from *their* 0.6 and *their* 0.4 throughout providing *their* 0.6 + *their* 0.4 = 1 **M2** for correct method e.g. 1 – *their* 0.6 × *their* 0.6 oe or **M1** for one correct branch e.g. *their* 0.6 × *their* 0.6 or *their* 0.4 × *their* 0.6	Accept 64% for **3** marks e.g. **M2** for $their\ \frac{2}{5} + their\frac{3}{5} \times their\frac{2}{5}$ for one correct branch condone just P(win) e.g. $their\ \frac{2}{5}$
	(c)		any correct reason e.g. the answer will be smaller	1		Their answer should explain the effect on the answer to part (b), ignore calculations, see appendix
13	(a)		Enlargement [centre] (−1,−1) [sf] −2	3	**B1** for each	If more than one transformation award **0**
	(b)		Reflection $y = -x$	2 1	**M1** for correct final image of their starting object	If more than one transformation award only **M1** if applicable If using triangle T the image will have vertices at (-1, -1) (-1, -4) and (-2, -1)

Question			Answer	Marks	Part marks and guidance	
14			Correct bar width and height of 0.6	**5**	**M2** for 10 × 1.7 + 10 × 1.5 + 30 × 1.2 or better e.g. 17 + 15 + 36 or 68 or **M1** for one correct frequency calculated e.g one of 17 or 15 or 36 AND **M1** for 80 – *their* 68 soi by 12 **M1** for *their* 12 ÷ 20 soi by 0.6 or a correct bar drawn from *their* frequency	
15			QMT and [diameter bisects chord] so VT [diameter] is perpendicular to PQ [chord] [MT is] common SAS	**1** **1** **1**		Also accept TMQ accept e.g. 'shared'
16	**(a)**		4.2	**1**		
	(b)		4479 to 4480	**2**	**M1** for 3800×1.042^4 oe	condone answer 4500 with **M1**
	(c)	**(i)**	[2034=] 6759 to 6760 and [2035=] 7043 to 7044	**3**	**B2** for 6759 to 6760 or 7043 to 7044 or **M1** for 3800×1.042^{14} oe or 3800×1.042^{15} oe	Also condone values of *n* between 14 and 15, for **3** marks one must be below 7000 and one at or above 7000, each rot to at least the nearest integer (see appendix)
	(c)	**(ii)**	It will take longer than 2034 [for the population to reach 7000]	**1**		*their* response must relate to the figures in **(c)(i)** e.g condone "decrease the number in part **(c)(i)**"

Question			Answer	Marks	Part marks and guidance	
17	(a)		1 10	**1** **1FT**	**FT** from *their* 1	
	(b)		[a =] 3 [b =] –5	**3**	**B2** for [a =] 3 or **B1** for [b =] –5 or **M1** for second difference +6 or for a correct pair of simultaneous equations	e.g. $a + b = -2$ and $4a + b = 7$
18			$2x^2 – 6x – 5x – 24 + 3$ [= 0] or better $(2x + 3)(x – 7)$ –1.5 oe 7	**M1** **M2** **B1**	 **M1** for two brackets giving two correct terms **FT** *their* brackets	e.g. $2x^2 – 11x – 21$ [= 0]
19			85.99… to 86 with correct working	**5**	**B4** for 7395[…] with correct working OR **M2** for correct method to find angle 125 e.g. 53 + 180 –108 or 360 – 108 – (180 – 53) or **M1** for correct method to find angle 72 or 127 e.g.180 –108 or 180 – 53 and **M2** for $\sqrt{35^2 + 61^2 - 2 \times 35 \times 61 \times \cos(their\ 125)}$ or **M1** for [AC^2=] $35^2 + 61^2$ – 2×35×61×cos (*their* 125) If **0, 1** or **2** marks scored, instead award **SC3** for answer 85.99… to 86 with no or insufficient working If **0** or **1** mark scored, instead award **SC2** for answer 7395[…] with no or insufficient working	"Correct working" requires at least **M1** from cosine rule **M2** implied by [angle ABC =] 125

Question			Answer	Marks	Part marks and guidance	
20	(a)		$x^2 + y^2 = 20$	2	**B1** for $x^2 + y^2 = k$	k could be r^2 or $\sqrt{20}^2$ but not 20
	(b)	(i)	[gradient =] $\frac{2}{4}$ or $\frac{1}{2}$ $m \times their\frac{2}{4} = -1$ used or implied	M1 M1	If **0** scored **SC1** for $-\frac{4}{2}$ or $-\frac{2}{1}$ without seeing $\frac{2}{4}$ or $\frac{1}{2}$	for **M1** allow $-2 \times \frac{2}{4} = -1$ or e.g. $-\frac{4}{2}$ after $\frac{2}{4}$ seen or $-\frac{2}{1}$ after $\frac{1}{2}$ seen
	(b)	(ii)	$y = -2x + 10$ oe	2	**B1** for $y = -2x + c$ seen oe or $-2x + 10$ or $c = 10$	'c' can be 0 but not 10
21			625 with no extras	3	**M1** for $\frac{x^{-\frac{1}{6}} \times x^{\frac{3}{4}}}{x^{\frac{1}{3}}} = 5$ or better **M1** for $-\frac{1}{6} + \frac{3}{4} - \frac{1}{3} = \frac{1}{4}$ or better e.g. $x^{\frac{1}{4}} = 5$	Alternative method : **M1** for $x^{\frac{1}{3}-\frac{3}{4}}$ or $x^{\frac{-5}{12}}$ or $x^{\frac{-1}{6}+\frac{3}{4}}$ or $x^{\frac{7}{12}}$ and **M1** for $x^{\frac{-1}{6}-their\frac{-5}{12}}$ or $x^{\frac{7}{12}-\frac{1}{3}}$ or $x^{\frac{3}{12}}$ or $x^{\frac{1}{4}}$ could be $x^{\frac{5}{12}}$ or $x^{\frac{-1}{4}}$ depends on which side of the equation

Question			Answer	Marks	Part marks and guidance	
22			[a =] 21 [b =] –31 with correct working	6	**M1** for $\frac{2-3\sqrt{18}}{\sqrt{18}+4} \times \frac{\sqrt{18}-4}{\sqrt{18}-4}$ **M1** for multiplying *their* numerator e.g. $2\sqrt{18} - 8 - 3 \times 18 + 12\sqrt{18}$ oe or better **M1** for simplifying *their* numerator e.g. $14\sqrt{18} - 62$ **M1** for multiplying *their* denominator e.g. $18 + 4\sqrt{18} - 4\sqrt{18} - 16$ oe or better e.g. 18 – 16 or 2 **M1** for $\sqrt{18} = 3\sqrt{2}$ at any stage and may be implied in working **A1dep** for [a =] 21 or [b =] –31 dep. on only **M4** awarded Alternative: **M1** for $[2 - 3\sqrt{18}] = (a\sqrt{2} + b)(\sqrt{18} + 4)$ **M1** for $a\sqrt{2}\sqrt{18} + 4a\sqrt{2} + b\sqrt{18} + 4b$ oe or better **M1** for $\sqrt{2}\sqrt{18} = 6$ or $\sqrt{18} = 3\sqrt{2}$ **M1** for $6a + 4a\sqrt{2} + 3b\sqrt{2} + 4b$ **M1** for $2 = 6a + 4b$ oe and $-9 = 4a + 3b$ oe **A1dep** for [a =] 21 or [b =] –31 dep. on only **M4** awarded If **0** scored **SC1** for [a =] 21 and [b =] –31	"Correct working" requires at least **M1M1M1M1** alternative : **M1** for $\sqrt{18} = 3\sqrt{2}$ **M1** for $\frac{2-9\sqrt{2}}{3\sqrt{2}+4} \times \frac{3\sqrt{2}-4}{3\sqrt{2}-4}$ **M1** for multiplying *their* numerator $6\sqrt{2} - 8 - 3 \times 18 + 36\sqrt{2}$ oe or better **M1** for simplifying *their* numerator e.g. $42\sqrt{2} - 62$ **M1** for $18 + 12\sqrt{2} - 12\sqrt{2} - 16$ oe or better e.g. 18 – 16 or 2 **A1dep** for [a =] 21 or [b =] –31 dep. on only **M4** awarded Note : working may be implied by use rather than explicitly seen and follow through from any errors if subsequent working is correct

Appendix

Exemplar responses for Q2(a)

	Mark
It's a square number and square numbers are not prime	**1 bod**
Its only factor is 1	**1**
It does not have two factors only one	**1**
It can only be 1×1	**1bod**
It only has itself as a factor	**1**
It can only be divided by itself	**1**
Doesn't have exactly 2 factors	**0**
It does not have two factors	**0**
It's a square number	**0**
Its only multiples are 1 and itself	**0**
It only goes into itself	**0**
It only has one prime factor	**0**
There is only 1 ×1 = 1 there are no other factors to make 1 and it's not a whole number (spoilt)	**0**
It does not have two factors that are not 1 or 0	**0**
It has the same factor	**0**
It does not have any factors	**0**

Exemplar responses for Q3(b)

They may have played less/more matches in total	**1**
We don't know how many games were played	**1**
The pie charts do not show how many matches were played by each team	**1**
B team could have played more games (or less)	**1**
C team may have played more games (or less)	**1**
They could have played a different number of games	**1**
They(C) may have played less matches in total	**1**
Pie charts do not show the actual figures (raw data)	**1**
Pie charts only show proportion	**1**
Bigger fraction might not reflect a bigger quantity	**1**
The numbers in B team may be higher than the numbers in C team (charts are labelled B team and C team)	**1**
No numbers so it could be correct or not we wouldn't know.	**1**
They do not know how many games B played	**0**
They do not know how many games C played …..	**0**
The total frequency is not given	**0**
The frequency may not be the same for both (frequency of what?)	**0**
It depends on how many times C wins	**0**
The information (or data) is not shown	**0**
We do not know the exact values	**0**
You can't guarantee everything will be equal	**0**
It might not be accurate	**0**
He can't tell accurately how many games were won	**0**
It depends on how many matches B plays (doesn't refer to both teams)	**0**
It depends on how many matches C plays (doesn't refer to both teams)	**0**

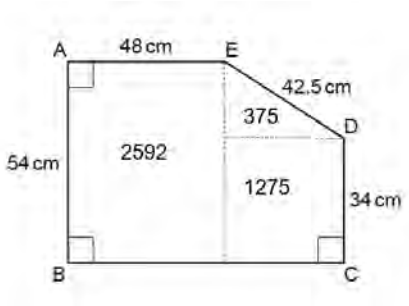
Exemplar responses for Q9(a)

	Mark
Expanding brackets gives $-x$	**1**
The signs are the wrong way round (condone inverted)	**1**
The minus sign is on the wrong one	**1**
They are the wrong factors	**0**
The answer is $(x-4)(x+5)$	**0**
The answer is 4 or – 5	**0**

Exemplar responses for Q9(b)

	Mark
[The third line] should be 2 – 5	1
She did 5 – 2 it should be 2 – 5	1
It should be – 5 not – 2	1
5 should be subtracted by 2	0
The error is in $3x = 5 – 2$	0

Question 10



Exemplar responses for Q12(c)

	Mark
[the answer] it will be smaller	1
the probability of winning will decrease	1bod
The probability of losing will increase	1 bod
They win less games	0
the answer will change because the probabilities have changed	0
the probability of losing will decrease	0
the probability of winning will increase	0

Question 16(c)(i)

14.1	6787.63
14.2	6815.62
14.3	6843.72
14.4	6871.93
14.5	6900.26
14.6	6928.71
14.7	6957.27
14.8	6985.96
14.9	7014.76

Other numbers will need calculating.
Logarithms
$3800\ (1.042)^n = 7000$
$(1.042)^n = 7000 \div 3800 = 1.842\ldots$
$n = \log 1.842 \div \log 1.042$
n = 14.8[48…] or 14.85 will score **M2**

2020 + 14.85 [= 2034.8…] or 2034 – 2020 [= 14] scores **A1**

Exemplar responses for Q16(c)(ii)

	Mark
It will take longer to reach 7000	**1**
It will not exceed 7000 by 2034 or 2035	**1**
the population will be lower in 2034	**1**
the population growth will be slower	**1**
there will be less birds [than expected]	**1**
they will need to use a different equation to calculate the population	**0**
the answer will reduce (or increase)	**0**
It will have a different outcome	**0**
The population of birds is going to decrease	**0**

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