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 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

PREPARATION FOR MARKING
SCORIS

1. Make sure that you have accessed and completed the relevant training packages for on-screen marking: *scoris 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 posted on the RM Cambridge Assessment Support Portal http://www.rm.com/support/ca

3. Log-in to scoris and mark the **required number** of practice responses ("scripts") and the **number of required** standardisation responses.

   YOU MUST MARK 10 PRACTICE AND 10 STANDARDISATION RESPONSES BEFORE YOU CAN BE APPROVED TO MARK LIVE SCRIPTS.

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 scoris 50% and 100% (traditional 40% Batch 1 and 100% Batch 2) 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 by telephone or the scoris messaging system, or by email.

5. **Crossed Out Responses**
   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 may give candidates the benefit of the doubt and mark the crossed out response where legible.

   Rubric Error Responses – Optional Questions
   Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Enter a mark for each question answered into RM assessor, which will select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

Multiple Choice Question Responses
When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).
When a question requires candidates to select more than one option/multiple options, then local marking arrangements need to ensure consistency of approach.

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

Short Answer Questions (requiring only a list by way of a response, usually worth only **one mark per response**)
Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth **two or more marks**)
If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response)
Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

6. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there then add a tick to confirm that the work has been seen.

7. 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.

8. The scoris **comments box** is used by 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 phone, the scoris messaging system, or e-mail.

9. Assistant Examiners will send a brief report on the performance of candidates to their Team Leader (Supervisor) via email by the end of the marking period. The report should contain notes on particular strengths displayed as well as common errors or weaknesses. Constructive criticism of the question paper/mark scheme is also appreciated.

10. For answers marked by levels of response: Not applicable in F501
    a. **To determine the level** – start at the highest level and work down until you reach the level that matches the answer
    b. **To determine the mark within the level**, consider the following:

Descriptor	**Award mark**
On the borderline of this level and the one below	At bottom of level
Just enough achievement on balance for this level	Above bottom and either below middle or at middle of level (depending on number of marks available)
Meets the criteria but with some slight inconsistency	Above middle and either below top of level or at middle of level (depending on number of marks available)
Consistently meets the criteria for this level	At top of level

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.

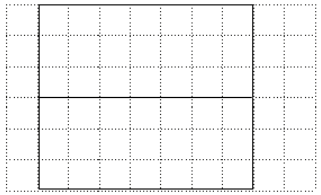
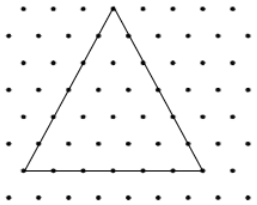
23. Ranges of answers given in the mark scheme are always inclusive.

24. For methods not provided for in the mark scheme (including visual representations such as bar models, ratio tables, etc) 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)		$3x(2x + 3)$ final answer	2	**B1** for $x(6x + 9)$ or $3(2x^2 + 3x)$ or correct answer seen and spoilt.	Condone missing final bracket and e.g. $2\times x$
	(b)		$(x + 5)(x + 3)$ final answer	2	**B1** for $(x + a)$ and $(x + b)$ where $ab = 15$ or $a + b = 8$	Condone missing final bracket
2	(a)		$v = u + at$ written or better e.g. $21 = u + 2 \times 8$ $[u =] 21 – 2 \times 8 [= 5]$ or $21 – 16 [= 5]$	B1 B1	 If **0** scored **SC1** for $5 + 2 \times 8$ or $5 + 16 [= 21]$	written means selected and better includes $u = v – at$
	(b)		104	3	**M2** for $21^2 = 5^2 + 2 \times 2 \times s$ or better oe or **M1** for $v^2 = u^2 + 2as$ seen	Equivalents include e.g. 6 + 8 + 10 + 12 + 14 + 16 + 18 + 20
3	(a)		435	3	**B2** for $[k =] 29$ or for an answer that satisfies both conditions e.g. $3 \times 5 \times 31 = 465$ or **M1** for $400 \div (3 \times 5)$ maybe implied by 26.66… or 26.7 or for $3 \times 5 \times$ (*their* prime number) correctly evaluated or for $3 \times 5 \times 27 = 405$	e.g. 29 used in final trial or even as *their* answer using any prime number that is greater than 29 e.g. **M1** for $3 \times 5 \times 23 = 345$ in working or $3 \times 5 \times 31 = 465$ with 31 as the answer treat factor trees or factor tables as multiplication
	(b)		any correct reason e.g. *a* and/or *b* are factors	1		see appendix

Question			Answer	Marks	Part marks and guidance	
4	(a)		(1.46, 715) accurately plotted	1		Tolerance : no daylight between *their* point and correct point
	(b)		Negative	1		Ignore embellishments
	(c)		(1.47, 620) ringed	1		allow any indication
	(d)	(i)	Accurate line of best fit	1		see overlay between (1.44, 720) and (1.44, 740) and between (1.60, 650) and (1.60, 670) and must reach vertical lines at each end, ignore beyond overlay
		(ii)	**FT** *their* line	1FT	**FT** *their* line with negative gradient only	tolerance : our reading ± 3
	(e)		Two different products correctly calculated, one product in the range 1.40 ≤ price ≤ 1.52 and one product in the range 1.52 < price ≤ 1.65	3	**B2** for one product correctly calculated or **B1** for one product calculated with the incorrect result	see appendix for the products, the points used must be either the given points or on *their* lobf not the outlier, if there are more than two products then select the best two
5			1261	3	**M2** for $8000(1 + \frac{5}{100})^3$ oe or **M1** for *their* 9261 – 8000 or $(1 + \frac{5}{100})^3$ oe implied by 1.157[625] or 1.158	**M2** implied by 9261 Note : 9200 and 1200 are the results by simple interest and score **0**

Question			Answer	Marks	Part marks and guidance	
6	(a)		7 by 6 rectangle (not dashed) with correct dividing line 	3	**B2** for a 7 by 6 rectangular outline or for any rectangular outline correctly splitting the shorter side in half by one line or **B1** for any rectangular outline	outline is not a square, accept horizontally or vertically accept freehand and for accuracy mark intention, condone dashed centre line If the diagram uses the grid edges and the line is not drawn **SC2** for an otherwise correct answer or **SC1** for a 7 by 6 rectangular outline
	(b)		Equilateral triangle with side 6 cm and no extra lines 	2	**B1** for equilateral triangle but the incorrect size or a correct equilateral triangle with one extra line	accept good freehand and for accuracy mark intention
7			2.6	2	**M1** for 36 920 ÷ 14 200	Allow clear correct conversions to other units so 0.0026, 2600 or 2 600 000 score **2** marks for **M1** condone figs 36 920 ÷ figs14 200
			g/cm^3 or $g\ cm^{-3}$	1		Units correct or consistent with *their* answer e.g. 0.0026 kg/cm^3, 2600 kg/m^3, 2 600 000 g/m^3 or 2.6 kg/dm^3 Accept units in words including use of "per".

Question			Answer	Marks	Part marks and guidance	
8			144	4	**M3** for $\frac{354}{15k+20k+24k} \times 24k$ oe or **M2** $\frac{354}{15k+20k+24k}$ or all three in a ratio e.g. 15*k* : 20*k* : 24*k* or **M1** for two ratios with a common number of red implied by 15*k* (white) and 24*k* (red seen, $k > 0$ or for 15*k* : 20*k* [:24*k*] or [15*k* :] 20*k* : 24*k*	**M3** implied by 90, 120, 144 with 144 not selected e.g. 3.75 : 5 : 6 and condone 15*k* : 20*k* with 20*k* : 24*k* also 3.75 : 5 [: 6]
9			4 655 to 4 655.7 or 4 656	4	**B2** for 21 or **M1** for $\frac{8.4}{2} \times 5$ oe and **M1** for π × 8.4^2 × *their* 21	Condone answer of 4652.7… or 4653 or 4656.9… or 4657
10	**(a)**		correct curve within tolerance	3	**B2** for 8 points accurately plotted or **B1** for 5 points accurately plotted	tolerance $\pm\frac{1}{2}$ small square radially for curve and points, some daylight between *y* = −8 and curve , condone a wobbly curve and slight feathering or tram lines in no more than 3 sections but no ruled lines and no dashed lines
	(b)		*x* = 0.5 oe	1		
	(c)		–2.3 or –2.4 3.3 or 3.4	2	**B1** for either answer **SC1** for an answer to more than 1 dp in each of −2.4 to −2.3 and 3.3 to 3.4 If **1** scored **FT** *their* curve for **2** marks or if **0** scored **FT** *their* curve for **1** or **2** marks or for **SC1**	tolerance $\pm\frac{1}{2}$ small square radially

Question			Answer	Marks	Part marks and guidance	
11			24	**4**	**M2** for $\frac{45}{12} \times 8$ or $\frac{8}{12} \times 45$ oe or 30 or **M1** for $\frac{45}{12}$ or $\frac{12}{45}$ or $\frac{12}{8}$ or $\frac{8}{12}$ oe and **M1** for 99 – 45 – *their* RQ or 24 correctly placed on diagram	Equivalent factors include 3.75, $3\frac{3}{4}$, $\frac{4}{15}$, 0.266… , 0.267, 1.5, $1\frac{1}{2}$, $\frac{2}{3}$, 0.666…, 0.667 Alt.: **M2** for $99 \div \frac{45}{12}$ (3.75) oe or 26.4 or **M1** for $\frac{45}{12}$ or $\frac{12}{45}$ oe and **M1** for $(26.4 - 8 - 12) \times \frac{45}{12}$ (3.75) oe
12			[y =] $56x^2$ with correct working	**6**	**B2** for $y = 3.5t^2$ or **M1** for $y = kt^2$ or better e.g.14 = $k2^2$ or k = 3.5 **B2** for $t = 4x$ or **M1** for $t = mx$ or better e.g. 12 = $m3$ or m = 4 **M1** for $y = 3.5(4x)^2$ If **0**, **1** or **2** scored, instead award **SC3** for $y = 56x^2$ with no working or insufficient working	"Correct working" requires evidence of at least **M1M1** or **B2** condone e.g. $y = kt^2$ and k = 3.5 for **B2** condone e.g. $t = mx$ and m = 4 for **B2** for **M1FT** allow combining *their* two expressions for y and t
13			17 with correct working	**4**	**B1** for 37.5 selected or 37.49[9…] **B1** for 2.25 selected **M1** for (36.5 to 37.5) ÷ (2.25 to 2.35) If **0** scored, instead award **SC1** for an answer of 17 with no working or insufficient working or **SC1** for either 36.5 and 37.49[9…]/37.5 or 2.25 and 2.349[9…]/2.35	"Correct working" requires evidence of at least **B1B1** alt. method **B1** for 2.25 selected **B1** for 37.5 selected **M1** for 2.25 × 16 = 36 **M1** for 2.25 × 17 = 38.25 Max. 3 marks unless the answer is 17 Note : 37 ÷ 2.3 = 16.08… with answer 17 scores **M1**

Question			Answer	Marks	Part marks and guidance	
14	(a)		0.8 × 100	1		accept $\frac{8}{10}$ oe fraction for 0.8
	(b)		1 654	4	**M3** for 80 × 2.5 + 95 × 3.4 + 75 × 5 + 120 × 6.3 or 200 + 323 + 375 + 756 or **M2** for the expression with two errors or **B1** for one of 95, 75 and 120 or **M1** for 80 × 2.5 + *their*95 × 3.4 + *their*75 × 5 + *their*120 × 6.3	for **M3** condone one error allow **M2** for 200 + 646 + 750 + 756 allow **M1** for e.g. 200 + 646 + 750 + 1575
15	(a)		24	3	**M1** for 16 = $\frac{1}{4}$ or 4 × 16 oe or 64 **M1** for *their* 64 – 16 – 15 – 9 oe	Alt.: **M1** for 16 × 3 and **M1** for 48 – 15 – 9
	(b)		$\frac{16}{40}$ oe or $\frac{16}{16+their\ 24}$ oe	2FT	**B1FT** for $\frac{16}{k}$ or $\frac{k}{16+their\ 24}$ (both proper fractions)	**FT** *their* 24
16			1763 or 1763.4 to 1763.5 with correct working	6	**M2** for $\frac{1}{2}$ × 72 × *their* 65.25… × sin 25 or **M1** for [AC=] 72cos 25 or 72sin 65 oe **M3** for $\frac{1}{2}$ × *their* 65.254 × *their* 42.24…× sin34 oe or **M2** for [AB=] $\frac{their 65.25... \times sin 38}{sin 108}$ oe or **M1** for $\frac{AB}{\sin 38} = \frac{their 65.25...}{\sin 108}$ oe If **0, 1** or **2** scored award **SC3** for answer 1763 or 1763.4 to 1763.5 with no or insufficient working If **0** or **1** scored award **SC2** for 992.79… or 992.8 or 770.69… or 770.7 with no or insufficient working	"Correct working" requires evidence of at least **M2** or **M1 M1** condone answers in range 1750 – 1780 with full correct working **M2** implied by 992.79… or 992.8 or maybe by 985 – 999[…] nfww or **M1** implied by [AC=] 65.2[5…] or 65.3 **M3** implied by 770.69… or 770.7 or maybe by 760 – 783 nfww **M2** implied by [AB=] 42.2[4…] accept any correct method e.g. **M2** for area of triangle ACD = ½ × 72sin25 × 72cos25 oe or **M1** for [CD=]72sin25 implied by 30.4…

Question			Answer	Marks	Part marks and guidance	
17			$\frac{271}{1000}$ or 0.271	**4**	**B3** for 271 OR **B2** for 1000 or 729 OR **M1** for 10 × 10 × 10 or 9 × 9 × 9	Accept any correct method e.g. **M3** for 1 × 10 × 10 + 9 × 1 × 10 + 9 × 9 × 1 or 271 or **M2** for two of these three terms correct or **M1** for one of these three terms correct
18	**(a)**		5 × 22 – 8 or $\frac{102+8}{5}$ = 22 oe	**M1**		Condone 110 – 8 or $5u_3 – 8 = 102$ then $5u_3 = 110$ then $u_3 = 22$
	(b)		6	**3**	**M2** for $\frac{22+8}{5}$ or better or **M1** for $u_3 = 5u_2 – 8$ or better	e.g. **M2** for $\frac{30}{5}$ e.g. **M1** for $22 = 5u_2 – 8$
	(c)		2 $u_2 = u_1$, so all terms will be equal	**B1** **B1**	 If **0** scored **SC1** for next term = 2 or 5 × 2 – 8 seen	

Question			Answer	Marks	Part marks and guidance	
19			[*h* =] 4.8 [*A* =] 1350 with correct working	**6**	**M2** for $\sqrt[3]{\frac{3750}{240}}$ or 2.5 oe or $\sqrt[3]{\frac{240}{3750}}$ or 0.4 oe or **M1** for $\frac{3750}{240}$ or 15.625 oe or $\frac{240}{3750}$ or 0.064 oe **B2** for [*h* =] 4.8 or **M1** for $\frac{12}{2.5}$ oe **B2** for [*A* =] 1350 or **M1** for 216 × (*their* 2.5)^2 oe	"Correct working" requires evidence of at least **M2** e.g. 12 × 0.4 e.g. 216 ÷ (*their* 0.4)^2 Note : Use of scale factor = $\frac{\sqrt[3]{3750}}{\sqrt[3]{240}}$ often leads to accuracy errors so award **M2** for $\frac{\sqrt[3]{3750}}{\sqrt[3]{240}}$ **M1** for $\frac{12}{their 2.5}$ oe (penalise accuracy once here at first occurrence) **M1 A1** for 216 × (*their* 2.5) = answer to A involving a rounding error

Question			Answer	Marks	Part marks and guidance	
20	**(a)**		$[2^3 - 3 \times 2 - 4 =]$ –2 $[3^3 - 3 \times 3 - 4 =]$ 14 and any indication of a sign change [so solution lies between 2 and 3]	**M1** **M1** **A1**	Must indicate their input and output Dep. on at least **M1** and different signs	Accept other values of *x* used between 2 and 3, correct to 2 figs rot, (see table in part (c)). For full marks, the two values need to produce a sign change. <u>Alternative method</u> **SC3** for using an iterative equation that converges **and** concluding statement that first two values lie between 2 and 3 oe
	(b)		[*x* = 2.5] 4.125 2 < x < 2.5	**B1** **B1**		Condone equals signs and condone in words, allow a smaller correct interval
	(c)		Two correct evaluations in the range 2 < x < 2.5, one which gives a positive value and the other giving a negative value [*x* =] 2.2	**M2** **A1**	**M1** for one correct evaluation in the range 2 < x < 2.5 Dependent on achieving at least **M1** <u>Alternative method</u> **M1** rearranges to a correct iterative formula (converging or diverging) and **M1** <u>attempts</u> first two iterations (either substitution seen or found to at least 2dp rot) and **A1** for 2.2 OR If **0** scored **SC1** for 2.2 with no worthwhile working	Working for **(c)** may be seen in **(b)** Examples 2.05 -1.53488 2.1 -1.039 2.15 -0.51163 2.2 0.048 2.25 0.640625 2.3 1.267 2.35 1.927875 2.4 2.624 2.45 3.356125 *condone missing suffixes here* e.g. $x_{n+1} = \sqrt[3]{3x_n + 4}$ with x_0 = 2, x_1 = 2.1544…, x_2 = 2.1872…

Exemplar responses for Q3(b)

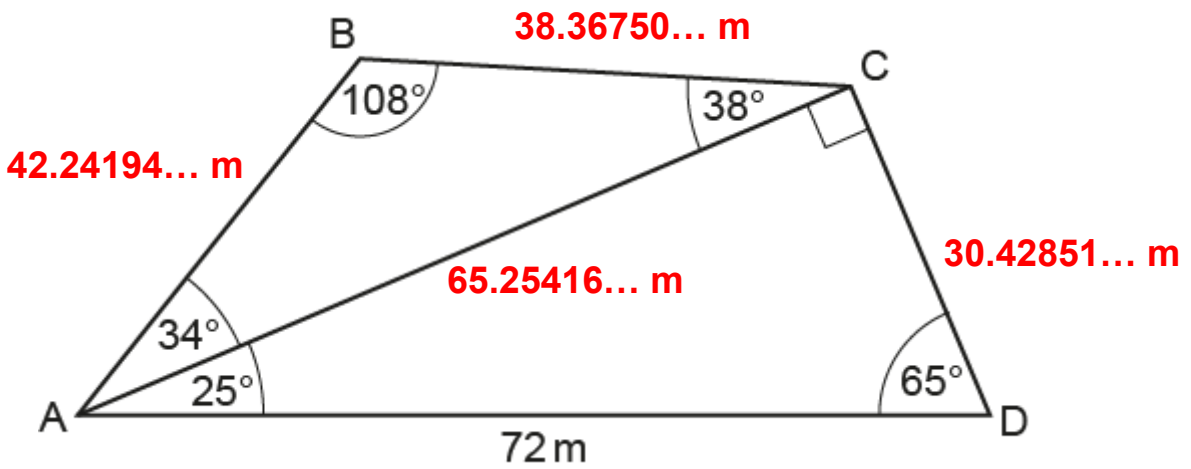
	Mark
it has four factors [1, *a*, *b*, *ab]*	**1**
a and/or *b* are factors	**1**
[two different prime numbers multiplied together do not make a prime number] because they are both factors of the new number	**1**
Any non-identical prime numbers create a non-prime number when multiplied together because the resulting number can be divided by both prime numbers	**1 (BOD)**
The product of two prime numbers is always divisible by both prime numbers ….	**1 (BOD)**
a × *b* has other factors aside from 1 and itself (*a* and *b*)	**1(BOD)**
a × *b* = 15 15 is divisible by 5 (may use other numbers)	**1 (BOD)**
it has factors besides itself and 1	**0 (not enough)**
two prime numbers multiplied together do not always become a prime number	**0**
Two prime numbers can multiply to make a number that isn't prime	**0**
2 primes make a non prime	**0**
A prime number x a prime number doesn't equal prime	**0**
A prime number can't have factors that are also prime	**0**
It can then be a multiple of another number	**0**
Divisible by more numbers other than 1 and itself	**0**

Question 4(e)

1.42	740	1050[.80]
1.45	725	1051[.25]
1.46	715	1043[.90]
1.5	705	1057[.50]
1.52	695	1056[.40]
1.54	685	1054[.90]
1.57	675	1059[.75]
1.6	660	1056[.00]
1.61	655	1054[.55]

allow rounded up as well

Question 16



Area of ABC = 770.687099… and area of ACD = 992.793598… total area = 1763.480697…

Note : condone answers in range 1745 – 1780, area ACD in range 985 – 998 and area ABC in range 760 – 783

Exemplar responses for Q18(c)

	Mark
$u_2 = u_1$, so all terms will be equal	**1**
every term is 2	**1**
repeats [infinitely]	**1**
because $u_2 = 2$	**0**
because u_2 equals u_1	**0**

Exemplar responses for Q20(a)

	Mark
Sign change …..	**A1**
$-2 < 0 < 14$	**A1(BOD)**
answer lies between 2 and 3	**A0**
answer is in the middle is insufficient	**A0**

x	fn
2	-2
2.1	-1.039
2.2	0.048
2.3	1.267
2.4	2.624
2.5	4.125
2.6	5.776
2.7	7.583
2.8	9.552
2.9	11.689

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