GCSE MARKING SCHEME

AUTUMN 2024

GCSE
MATHEMATICS
UNIT 1 – INTERMEDIATE TIER
3300U30-1

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

WJEC GCSE MATHEMATICS

AUTUMN 2024 MARKING SCHEME

GCSE Mathematics **Unit 1: Intermediate Tier**	Mark	Comments
1. **INPUT** / **OUTPUT** –7 / **–15** **–24** / –100 2·5 / **32·5** n / **$5(n + 4)$**	 B1 B1 B1 B2	Mark final answer in table. If answers are not given in table, they must be clearly identified in the working space. Must include brackets or be fully simplified for B2. Award B2 for one of the following (or equivalent) as a final answer: • $5(n + 4)$ • $5(4 + n)$ • $5n + 20$ • $5 \times (n + 4)$ • $(n + 4)5$ • $(n + 4) \times 5$. Award B1 for one of the following (or equivalent) as a final answer: • $n + 4 \times 5$ • $5 \times n + 4$ • sight of correct expression with incorrect final answer (e.g. $5(n + 4) = 5n + 4$ or $5(n + 4) = n$) • $\ldots n + 20$ • $5n + \ldots$
2. 30 × 8000 = 240 000 30 × 7900 = 237 000 30 × 7940 = 238 200 33 × 8000 = 264 000 35 × 8000 = 280 000	M1 A1	Award M1 for any one of the products shown in the table. Award A1 for the corresponding approximation. ISW Unsupported answers will get M0A0. An answer of 262 020 or 262 020 approximated is awarded M0A0. <u>If no marks</u>, award SC1 for one of the following as a final answer: • 3 × 8 = 240 000 • 3 × 79 = 237 000 • 3 × 794 = 238 200 • 33 × 8 = 264 000 • 35 × 8 = 280 000.
3.(a) $3g - 5f$ or $-5f + 3g$	B2	Mark final answer. Must be in an expression for B2. Award B1 for one of the following: • sight of $(+)3g$ • sight of $-5f$ (do not allow $\ldots - -5f$) • $3g + -5f$.

3.(b)	$5 \times 3 + 4R = 23$ or equivalent $4R = 8$ or equivalent $(R =) 2$	M1 A1 A1	 Implies M1. (23 – 15 =) 8 or equivalent implies M1 but not M1A1. (23 – 15 =) 8 then 8 ÷ 4 or equivalent implies M1A1. FT only from $4R = k$. Mark final answer. Unsupported answer of 2 is awarded M1A1A1. $R = \frac{8}{4}$ is awarded M1A1A0. Allow M1A1A1 for a correct embedded answer BUT only M1A1A0 if contradicted by $R \neq 2$. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. <u>If no marks, award SC1 for one of the following:</u> • unsupported $R = 9{\cdot}5$ (from $4R = 23 + 15$) • sight of 107 (from 15 + 92).
3.(c)	Line D	B1	
4.(a)	Bethan = **14** (years old) Andrew = **21** (years old) Richard = **24** (years old)	B2	 For B1, check for the required conditions being met and not the individual numbers. *Required conditions (or equivalent) are:* *B + A + R = 59* *A – B = 7* *R – A = 3* *R – B = 10* Award B1 for one of the following: • two conditions correct • 14, 21, 24 allocated to the incorrect people e.g. **B** = 14, **A** = 24 and **R** = 21 (correct answer not seen in working space). A condition must be met using non-negative ages, otherwise B0. Values on the answer lines take precedence. However, award B2 for one of the following: • the answer lines are left blank and the correct answers (correct ages allocated to the correct people) are seen in the working space • the correct answers (correct ages allocated to the correct people) are seen in the working space, but ages allocated to the incorrect people on the answer lines.
4.(b)(i)	27 : 30 9 : 10	 B1 B1	Answer line takes precedence. Must be in a ratio for B1. Award B1 for one of the following: • simplifying 27 : 'their 30' correctly evaluated • an answer of 7 : 8 (from 21 : 24) • 10 : 9 (unsupported or from 30 : 27). Award B1 B1 for an unsupported answer of 9 : 10.

4.(b)(ii) Valid explanation e.g. “they are not the same age” “Andrew is younger (so they can’t be the same)” “Richard is older (so they can’t be the same)” “Richard is 3 years older” “They’ll always be different” “(there’s a) difference in their ages” “their ages are not equal” “they are 3 years apart” “1:1 means they are the same age” “there’s a gap (in their ages)” “they were born different dates”	E1	Do not allow FT from 4(b)(i). Do not allow: • further spurious **incorrect** comments e.g. “they are 3 years apart, so their ratios have to add to 3” • “Andrew will always be older” • “Because Andrew is 7 years older”.

5.

Complete method to find the volume

M3

Note: check diagram for the area and missing lengths
If not M3 award M2 or M1 depending on the entries in the table.
Calculations such as 12 × 12 × 5 × 16 × 2 are awarded M0.
For M2 and M1, FT 'their (16 – 12)' or 'their (12 – 5)' where appropriate.

For example:

Square and rectangle (allow any equivalent valid method)

- 2 × (12 × 12 + 5 × (16 – 12))
- 2 × (12 × 12 + 5 × 4)
- 2 × (144 + 20)
- 288 + 40
- 2 × 164

Two rectangles (allow any equivalent valid method)

- 2 × (5 × 16 + 12 × (12 – 5))
- 2 × (5 × 16 + 12 × 7)
- 2 × (80 + 84)
- 160 + 168
- 2 × 164

Three rectangles (allow any equivalent valid method)

- 2 × (12 × (12 – 5) + 5 × 12 + 5 × 4))
- 2 × (12 × 7 + 5 × 12 + 5 × 4)
- 2 × (84 + 60 + 20)
- 168 + 120 + 40
- 2 × 164

Larger rectangle – smaller rectangle (allow any equivalent valid method)

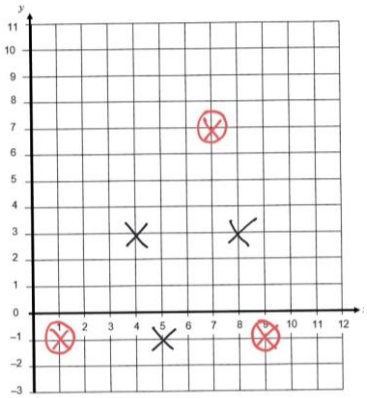
- 2 × (16 × 12 – (16 – 12) × (12 – 5))
- 2 × (16 × 12 – 4 × 7)
- 2 × (192 – 28)
- 2 × 164
- 384 – 56

Award M2 for **one** of the following: *(summing two areas/subtracting two areas/finding **one** volume)*	Award M1 for **one** of the following: *(calculating one area)*
Square and rectangle	
• 12 × 12 + 5 × (16 – 12) • 12 × 12 + 5 × 4 • 144 + 20 • **164** • 2 × 12 × 12 • 2 × 144 • **288** • 2 × 5 × (16 – 12) • 2 × 5 × 4 • 2 × 20 • **40**	• 12 × 12 • **144** • 5 × (16 – 12) • 5 × 4 • **20**
Two rectangles	
• 5 × 16 + 12 × (12 – 5) • 5 × 16 + 12 × 7 • 80 + 84 • **164** • 2 × (5 × 16) • 2 × 80 • **160** • 2 × 12 × (12 – 5) • 2 × 12 × 7 • 2 × 84 • **168**	• 5 × 16 • **80** • • 12 × (12 – 5) • 12 × 7 • **84**
Three rectangles	
• 12×(12–5)+ 5 ×12+5×4 • 12 × 7 + 5 × 12 + 5 × 4 • 84 + 60 + 20 • **164** • 2 × 12 × (12 – 5) • 2 × 12 × 7 • 2 × 84 • **168** • 2 × 5 × 12 • 2 × 60 • **120** • 2 × 5 × 4 • 2 × 20 • **40**	• 12 × (12 – 5) • 12 × 7 • **84** • 5 × 12 • **60** • 5 × 4 • **20**
Larger rectangle – smaller rectangle	
• 16 ×12–(16 –12)×(12–5) • 16 × 12 – 4 × 7 • 192 – 28 • **164** • 2 × 16 × 12 • 2 × 192 • **384** • 2 × (16 – 12) × (12 – 5) • 2 × 4 × 7 • 2 × 28 • **56**	• 16 × 12 • **192** • (16 –12)×(12 – 5) • 4 × 7 • **28**

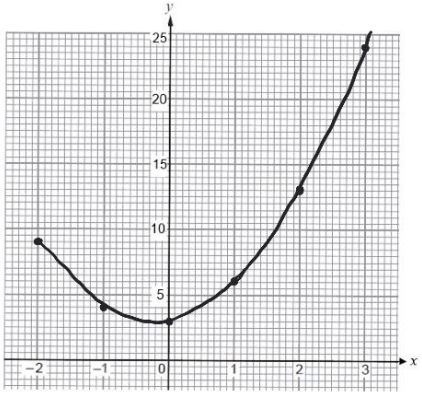
(Volume =) 328 (cm^3)

A1

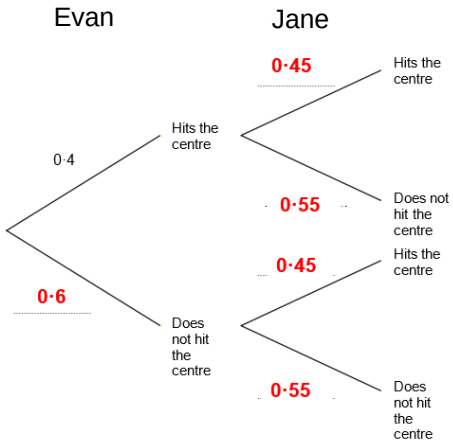
CAO

Organisation and Communication. Accuracy of writing.	OC1 W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
6. Plotting the three given points (black crosses below). Three correct possible points for the 4th vertex plotted (red crosses below) AND correct coordinates given. (7, 7) (9, -1) (1, –1) 	P1 B3	Answer lines take precedence. For P1 B3 only 6 points should be plotted on grid. Award B2 for one of the following: • correct coordinates of at least two possible points for the 4th vertex • 3 possible points for the 4th vertex are indicated on the grid but coordinates not given or given incorrectly with no more than 6 points on the grid. Award B1 for one of the following: • correct coordinates of one possible point for the 4th vertex • 2 possible points for the 4th vertex are indicated on the grid but coordinates not given or given incorrectly with no more than 6 points on the grid.
7. A = 7 B = 9 C = 2	 B2 B2 B2	Check diagrams for answers. Answer lines take precedence. Award B1 for sight of 3A + 2 = 23 or 3A = 21. Award B1 for sight of 2B + 10 = B + 19 or equivalent e.g. 2B = B + 9 or B + 10 = 19 or (B =)19 –10. Do not award B1 for (19 –10) ÷ 3 (may be seen in stages). **Strict** FT ‘$\frac{\text{their A}’ \times 2 + \text{‘their B’} - 19}{2}$ for B2 or B1. On FT, if C ≤ 0, then award B1 only. Award B1 for one of the following: • 2C = 4 or equivalent (e.g. C + C = 4) • sight of 2C + 25 = 7 + 7 + 9 + 6 or equivalent • sight of 2C + 25 = ‘their A’ × 2 + ‘their B’ + 6 or equivalent. Allow an embedded answer but penalise -1 (for each letter) if later contradicted.

8. $(6x =)$ $360 - (42 \times 6)$ $(= 108(°))$ $\div 6$ $(x =)$ $18(°)$	M2 m1 A1	Check diagram for answers. Sight of 108(°) implies M2. Award M1 for sight of 42×6 or 252(°). Award m1 only if M2 awarded. CAO. Mark final answer. Unsupported 18 is awarded M2m1A1. Allow an embedded answer but penalise -1 if contradicted by $x \neq 18$ or equivalent Award SC1 for a final answer of 30(°) or 9·4...(°) (must be clearly using rotational symmetry of order 5 or 7).
8. <u>Alternative method 1</u> *$360 \div 6$* *$60(°)$* *$(x =)$ $60 - 42$ or $42 + x = 60$* *$18(°)$*	*M1* *A1* *m1* *A1*	*Sight of 60(°) implies M1 A1* *FT 'their derived 60'– 42, provided M1 awarded and 'their derived 60' > 42.* *Unsupported 18 is awarded M1A1M1A1.* *Mark final answer.* *Allow an embedded answer but penalise -1 if contradicted by $x \neq 18$ or equivalent* *If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction.* *Award SC1 for a final answer of 30(°) or 9·4... (°) (must be clearly using rotational symmetry of order 5 or 7).*
8. <u>Alternative method 2</u> *$6(42 + x) = 360$ or $42 + x = 360 \div 6$* *$252 + 6x = 360$ or $42 + x = 60$* *$(x =)$ 18(°)*	*B2* *B1* *B1*	*Award B1 for sight of $6(42 + x)$ or $360 \div 6$* *FT from $6x = k$, if B2 B0 previously awarded.* *Mark final answer.* *Allow an embedded answer but penalise -1 if contradicted by $x \neq 18$ or equivalent* *If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction.* *Award SC1 for a final answer of 30(°) or 9·4... (°) (must be clearly using rotational symmetry of order 5 or 7).*
9. (Area =) $\frac{(15 + 9)}{2} \times 8$ or equivalent $= 96$ cm^2	 M1 A1 U1	May be seen in stages. Award M1 for one of the following: • $\frac{(15 - 9) \times 8}{2} + 8 \times 9$ $(= 24 + 72)$ • $15 \times 8 - \frac{8 \times (15 - 9)}{2}$ $(= 120 - 24)$ Allow M1A1 for correct intent or complete method <u>seen</u> with correct answer .e.g. $15 + 9 \times 8 \div 2 = 96$ Independent of all other marks.

10. For a correct method that produces 2 prime factors from the set {3,3,3,5,7} before 2nd error. 3, 3, 3, 5 , 7 $3^3 \times 5 \times 7$	M1 A1 B1	Must be a method that involves only division. Check for errors in the method before checking the 2 prime factors from the set. CAO. For sight of the five correct factors (ignore 1s) with no other terms (if tree method used, use end of branches). FT 'their primes' provided at least one index form used with at least a square. Do not FT non-primes. Allow $(3^3)(5)(7)$ or $3^3.5.7$ Do not allow $3^3,5,7$. Inclusion of 1 as a factor gets B0.
11.(a) 9 13	B2	Answers in table take precedence. B1 for each.
11.(b) At least 4 correct plots and no incorrect plot. A smooth curve drawn through their plots.	P1 C1	FT 'their (–2,9)' and 'their (2,13)' OR (–2,9) and (2,13) plotted (even when not shown in the table or contradicted). Allow ± '½ a small square'. FT 'their 6 plots' OR a curve through the 4 given points **AND** (–2,9) and (2,13). Clear intention to draw a curve through 'their plotted points'(± 1 small square horizontally or vertically). 

12. (Number of Year 9 pupils in Ysgol Afon =) 127 (Number of Year 9 pupils in Ysgol Twyn =) $\frac{60}{360} \times 480$ or equivalent (e.g 480 ÷ 2 ÷ 3, 240 ÷ 3…) 80 (Total number of pupils = 508 + 480 =) 988 or (Total number of pupils = 494 + 287 + 207 =) 988 (Probability from Year 9 =) $\frac{207}{988}$ ISW	B1 M1 A1 B1 B1	*Answers may be seen on diagram* Do not award B1 if 127 is clearly labelled as Year 7 Ysgol Afon. May be seen in stages. An answer of 80 implies M1A1. CAO. Sight of 207 implies the first B1 M1 A1. The numerator and denominator must both be integers for B1. FT 'their 127' + 'their 80' , provided 'their 988' • fraction <1 • 'their 988' from 'total for Ysgol Afon' + 480 • 'their numerator' is a sum of two values but NOT 90 + 60 (angles). Penalise incorrect notation -1 e.g. '207 in 988'. If no marks awarded, SC1 for engaging with the total number of pupils in Ysgol Afon. This could be sight of 508 or 254 + 254 or equivalent (seen or implied).
13. $2x + 3(x + 6) = 78$ or equivalent $5x + 18 = 78$ $5x = 60$ $(x) = 12$ 12 and 18	M2 A1 A1 A1 B1	Answer lines takes precedence. Brackets may be implied by later correct work. Award M1 for one of the following: • Sight of $2x + 3(x + 6)$ or equivalent • $2x + 3x + 6 = 78$ (brackets omitted or incorrect). CAO. May be implied in later working. FT from M2 or M1, 'their $5x + 18 = 78$'. FT from M2 or M1, 'their $5x = 60$'. FT 'their algebraically derived 12' and 'their 12 + 6' correctly evaluated. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. If M2 is awarded as the first step (forming an equation), then award the following A1A1A1B1 for 12 and 18 clearly identified as final answers (even if trial and improvement is then used).
14. (w =) $18{\cdot}9 \times \frac{6}{9}$ OR $\frac{w}{18.9} = \frac{6}{9}$ or equivalent OR (w =) $18{\cdot}9 \div \frac{9}{6}$ OR $\frac{18.9}{9} = \frac{w}{6}$ or equivalent $w = 12{\cdot}6$	M1 A1	May be seen in stages. M1 for correct use of scale factor $\frac{2}{3}$ or equivalent. An unsupported answer of 12·6 is awarded M1A1.

15.(a) 0·6 or equivalent on correct Evan branch. 0·45 and 0·55 or equivalent correctly shown on both pairs for Jane.  	B1 B2	Award B1 for one of the following: • 0·45 and 0·55 or equivalent correctly shown on one pair of Jane's branches only • 0·45 and 0·55 or equivalent consistently reversed on all Jane branches.
15.(b) 0·4 × 0·45 or equivalent 0·18 or equivalent ISW	M1 A1	FT 0·4 × 'Jane's probability of hitting the centre' provided less than 1.
16.(a) Sight of $x^2 + 8x + 15 = 120$ (leading to $x^2 + 8x - 105 = 0$)	B2	Must be convincing. Award B1 for one of following: • $(x + 5)(x + 3) = 120$ • $x^2 + 5x + 3x + 15$ • $x^2 + 8x + 15$ • $x^2 + kx + 15 = 120$ $(k \neq 0)$ • $x^2 + 8x + k = 120$ $(k \neq 0$ or $-105)$.
16.(b) $(x + 15)(x - 7)$ $(x =) -15$ AND $(x =) 7$	 B2 B1	May be seen in part (a) or (c), provided not contradicted in (b). Award B1 for one of the following: • $(x$ ... $15)(x$ ... $7)$ • two brackets which multiply to give $x^2 + 8x + k$ but not $(x + 5)(x + 3)$ • two brackets which multiply to give $x^2 + kx - 105$. Mark final answer. **Strict FT** from their brackets, provided not from $(x + 5)(x + 3)$. If no factorising shown, allow the following: B2 for $x + 15\ (=0)$ AND $x - 7\ (=0)$ (B1) $(x =) -15$ AND $(x =) 7$ (B1) B1 for $x - 15\ (=0)$ AND $x + 7\ (=0)$ (B0) $(x =) 15$ AND $(x =) -7$ (B1) FT B1 if only $(x =) -15$ AND $(x =) 7$ seen. (B1)

16.(c) Length = 12 (cm), Width = 10 (cm) Statement about ignoring $x = -15$ **as it leads to negative lengths** or that x must be > -3.	 B1 E1	Allow dimensions and/or justification to be seen in part (a) or (b), provided not contradicted in (c). Answer lines take precedence. FT 'their 7' + 5 and 'their 7' + 3 provided • one x value from (b) > -3 **AND** one x value from (b) < -3 • both length and width are positive. If not on answer line, must clearly be length and width. Unsupported answers are awarded B1. Allow "you can't have a negative length (on the rectangle)" "the width can't be negative" Do not accept incorrect or vague explanations e.g. "x can't be negative" "x must be positive" "it can't be negative".
17. $3{\cdot}2 \times 10^4 \div 1000 \div 8 \times 5$ or equivalent 20 or equivalent	 M2 A1	Answer line takes precedence. Operations can be made in any order. Award M1 for sight of one the following: • $3{\cdot}2 \times 10^{(1)}$ (km) • $3{\cdot}2 \times 10^4 \div 1000$ or answer of 32 • $3{\cdot}2 \times 10^4 \div 1000 \div 8$ or answer of 4 • $3{\cdot}2 \times 10^4 \div 1000 \times 5$ or answer of 160 • $3{\cdot}2 \times 10^4 \div 8 \times 5$ or answer of 20 000 • $3{\cdot}2 \times 10^4 \div 1{\cdot}6$ or answer of 20 000 • One place value error (e.g. 2×10^x, $3{\cdot}2 \div 1{\cdot}6$). CAO.
18.(a) 125°	B1	
18.(b) (Obtuse $B\hat{O}D$ =) 110(°) (y =) $\frac{180 - 110}{2}$ or equivalent 35(°)	 B1 M1 A1	*May be seen on the diagram.* FT 360 – 2 × 'their value of x in part (a)'. Value of x in part (a) / $B\hat{O}D$ 55° / 250(°) 70° / 220(°) 110° / 140(°) 135° / 90(°) FT $\frac{180 - \text{'their 110'}}{2}$ (may be stated or derived, provided 'their 110°' is not 55° and <180°).