GCSE MARKING SCHEME

SUMMER 2024

GCSE
MATHEMATICS
UNIT 2 – INTERMEDIATE TIER
3300U40-1

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

SUMMER 2024 MARK SCHEME

Unit 2: Intermediate Tier	Mark	Comments
1.(a) $x = 100$	B1	Mark final answer. Allow B1 for a correct embedded answer BUT B0 if contradicted by $x \neq 100$.
1.(b) $7m = 28$ $m = 4$	B1 B1	FT from $7m = k$. Unsupported answer of 4 is awarded B1B1. $m = \frac{28}{7}$ is awarded B1B0. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction or decimal (e.g. if $7m = 34$, then $m = \frac{34}{7}$ is awarded B0B1, but $m = 34 \div 7$ is awarded B0B0). Allow B1B1 for a correct embedded answer BUT only B1B0 if contradicted by $m \neq 4$.
2.(a) 0·55 × 42·8 or equivalent. = 23·54	M1 A1	Award M1 for complete method. CAO. If 23·54 is seen, but then **a rounded or truncated** (e.g. 23·5) value is given award M1A1. Do **not** ignore any other subsequent work (e.g. 23·54 seen but then 66·34 given as a final answer is awarded M1A0). An unsupported answer of 23·54 is awarded M1A1. If no marks, award SC1 for an answer of: • 23·5 (unsupported) • 23·54% (unsupported) • 66·34 (× 1·55) (supported or unsupported) • 19·26 (× 0·45) (supported or unsupported).
2.(b) $\frac{3}{16}$	B1	
3.(a) Accurate drawing of triangle *ABC*.	B2	Award B1 for one of the following: • *AC* = 8 cm • *BC* = 6·5 cm • triangle with *AC* = 6·5 cm and *BC* = 8 cm • sight of 8 cm AND 6·5 cm.
3.(b)(i) 111(°)	B1	**Strict FT** from their drawing.
3.(b)(ii) 24 ± 0·4 (m)	B1	Answer line takes precedence.
4.(a) 8·6 litres	B1	

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4.(b) 1740 (minutes)	B2	Answer line takes precedence. Award B1 for sight of one of the following: • 24 × 60 + 5 × 60 • 24 × 'their 60' + 5 × 'their 60' • 'their 24 × 60' + 5 × 60 • 29 × 60 • 29 × 'their 60' • 'their 24 + 5' × 60 • 1440 (24 × 60) • 300 (5 × 60) • 104 400 (seconds). An unsupported answer of 1740 (minutes) is awarded B2.
4.(c) Sight of 6·3 OR 630	B1	
0·46 (m) OR 46 (cm)	B2	**If units given, they must be correct.** Mark final answer. FT 6.76 – 'their 6.3' provided 6.2 ≤ 'their 6.3' ≤ 6.4 **OR** 676 – 'their 630' provided 620 ≤ 'their 630' ≤ 640. Award B1 for one of the following: • 6·76 − 6·3 • 676 – 630. An unsupported answer of: • 0·46 or 46 is awarded B1B2 (if units given, they must be correct) • 0·46 cm or 46 m is awarded B1B1.
5.(a) Correct cuboid	B2	Ignore orientation of cuboid. For B2, their cuboid must have edges of correct length along or parallel to the 3 directions usually associated with isometric paper (the two diagonals and the vertical). Award B1 for any one edge dealt with correctly for all its three visible occurrences in a cuboid. For any mark to be awarded the line must go 'through the dots' AND have both ends 'on a dot'. Ignore attempt at handling 'hidden lines'. If no marks, award SC1 for a correct 'isometric' cuboid drawn with dimensions 6cm by 4cm by 2cm (counting dots) in any orientation.

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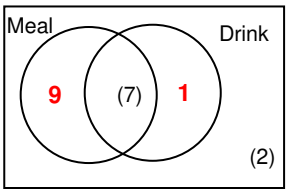
5.(b) (Volume =) $7 \times 5 \times 3$	M1	M1 must be for a complete correct method. e.g. any further manipulation to $7 \times 5 \times 3$ is M0.
$= 105$	A1	CAO An unsupported final answer of 105 is awarded M1A1U0.
cm^3	U1	Independent of other marks (e.g. M0 could have been previously awarded or no volume given). An unsupported answer of $105cm^3$ is awarded M1A1U1.
6.(a)		Answer in table takes precedence.
$1 - (0{\cdot}54 + 0{\cdot}12 + 0{\cdot}25)$ or equivalent	M1	Award M1 for complete method. Note: $1 - 0{\cdot}91$
$= 0{\cdot}09$ or equivalent	A1	Mark final answer. An unsupported answer of $0{\cdot}09$ or equivalent is awarded M1A1.
6.(b) 2300 (balls)	B2	Mark final answer. Award B1 for one of the following: • $575 \div 0{\cdot}25$ • 575×4 • $575 \times 2 \times 2$ • $575 \div 25 \times 100$ • sight of 1242, 276, 575, 207 (separate colours) • sight of 1242, 276, 575, 2300 × 'their $0{\cdot}09$' evaluated correctly (separate colours) • $575 \times 3 + 575$ (the number of non-blues + the number of blues) • other complete valid method • unsupported 2300 as a denominator in a fraction <1. An unsupported answer of 2300 (balls) is awarded B2.
7. $51{\cdot}3 = 2{\cdot}3 + 9{\cdot}8\ (\times)\ t$ or equivalent	M1	
$49 = 9{\cdot}8\ (\times)\ t$ or equivalent	A1	Implies M1.
$t = 5$	A1	FT only from $k = 9{\cdot}8\ (\times)\ t$. Mark final answer. An unsupported answer of 5 is awarded M1A1A1. $t = \frac{49}{9.8}$ is awarded M1A1A0. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction or decimal. Allow M1A1A1 for a correct embedded answer BUT only M1A1A0 if contradicted by $t \neq 5$. If no marks, award either: • SC2 for an answer of $5{\cdot}469\ldots$ or $5{\cdot}47$ (from $t = 53{\cdot}6 \div 9{\cdot}8$) **OR** • SC1 for $53{\cdot}6 = 9{\cdot}8\ (\times)\ t$.

Unit 2: Intermediate Tier	Mark	Comments
8. (Time difference =) 16 (hours) or 960 (minutes) (One third of 16 hours =) $\frac{1}{3}$ × 16 (hours) or $\frac{1}{3}$ × 960 (minutes) or equivalent 5 (hours) 20 (minutes)	B1 M1 A1	FT 'their time difference' only if not a multiple of 3 hours. Answer must be in hours and minutes for A1. Accept rounded or truncated answers. Award B1 M1 A0 for a final answer of one of the following: • 5⅓ (hours) • 5·33(…hours) • 5·20 • 5:20 • 320 (minutes). An unsupported answer of 5 (hours) 20 (minutes) is awarded B1M1A1.
8. 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
9. (Circumference =) 2 × π × 38 or π × 76 an answer between 238·6 and 239 inclusive (cm) 240 (cm)	M1 A1 B1	Award A1 for sight of 76π. Award B0 for 240·0(00…). FT 'their circumference' correctly given to 2 significant figures, provided > 100 and π has been used. An unsupported final answer between 238·6 and 239 inclusive (cm) is awarded M1A1B0. An unsupported final answer of 240 (cm) is awarded M1A1B1.

Unit 2: Intermediate Tier	Mark	Comments
10. (Distribution = 360 – 60 – 138 =) 162(°)	B1	May be seen on diagram.
$\frac{162}{360}$ or $\frac{9}{20}$ or equivalent	M1	FT $\frac{\text{'their stated 162'}}{360}$, provided obtuse.
= 0·45	A1	Answer must be given as a decimal. Mark final answer. FT provided 'their fraction' < 1. If 0·45 seen, but then 45% or $\frac{45}{100}$ or equivalent award B1M1A1. Award B1 M1 A0 for 45% or equivalent (not a decimal) if 0·45 not seen. If no marks, award SC1 for the correctly evaluated decimal equivalent of an answer of $\frac{\text{'their stated 162'}}{60 + 138 + \text{'their stated 162'}}$ e.g. $\frac{154}{352}$ = 0·4375 (angle measured in diagram) An unsupported answer of 0·45 is awarded B1M1A1.
10. Alternative method *1 – $\frac{198}{360}$ or 1 – $\frac{11}{20}$ or equivalent*	*M2*	*Award M1 for 1 – $\frac{\text{'their 138 + 60'}}{360}$.*
= 0·45	*A1*	*Answer must be given as a decimal.* *Mark final answer.* *FT provided 1 – 'their fraction < 1'.*
11.(a) 0·27 or equivalent.	B2	Mark final answer. Allow ±0·27 OR (+)0.27 'and/or' –0.27. Award B1 for sight of one of the following: • 0·27 (or equivalent) followed by subsequent working • –0·27 • 0·0729.
11.(b) 8	B1	Answer line takes precedence. Allow embedded answer in working space provided not contradicted on answer line.
11.(c) 7	B1	Answer line takes precedence. Allow embedded answer in working space provided not contradicted on answer line.

Unit 2: Intermediate Tier	Mark	Comments
12.(a)  	B2	Answers on diagram take precedence. For 9 AND 1 in correct position. Do not award B2 if more than one number is shown in the same section. Ignore 2 and 7 duplicated (in the correct place) for this B2. If B2 not awarded, award B1 for one of the following, provided no sections are blank and values are whole numbers: • 'their 9' + 'their 1' = 10 • 7 + 'their 9' = 2 × (7 + 'their 1'). A B1 may be awarded even if more than one number is shown in the same section as long as the total for awarding a B1 is correct.
12.(b) $\frac{16}{19}$ or equivalent. ISW	B2	FT $\frac{\text{'their 9'} + 7}{19}$ in a fraction < 1, provided Meal only not blank. If not B2, award B1 for one of the following in a fraction < 1: • a numerator of 16 • a numerator of 'their 9' + 7, provided Meal only section not blank • a denominator of 19 • a denominator of 'their 9' + 'their 1' + 9. An answer of $\frac{16}{19}$ gains B2 regardless of 'their Venn diagram'. Penalise incorrect notation (e.g. '16 in 19') −1.
13.(a) 4	B1	Answer in table takes precedence.
13.(b) At least 6 correct plots and no incorrect plot	P1	FT 'their (1,4)'. Allow ± '½ a small square'. Ignore any additional points plotted on the curve.
A smooth curve drawn through their plots	C1	FT 'their 7 plots' OR a curve through the 6 given points **AND** (1,4). Allow intention to pass through their plots (± '1 small square horizontally **or** vertically)'.

Unit 2: Intermediate Tier	Mark	Comments
13.(c) −3·7 AND 1·2	B2	Answer line takes precedence. May be seen in any order. Allow ± '1 small square' i.e. ± 0.1. FT intersection of 'their curve' with $y = 6$ only if exactly two points of intersection. Award B1 for one of the following: • line $y = 6$ drawn (must be at least 5 small squares long) • −3·7 • 1·2 • one correct intersection of 'their curve' with $y = 6$ • two correct intersections of 'their curve' with 'their $y = 6$' only if exactly two points of intersection.

Unit 2: Intermediate Tier	Mark	Comments
14.		Answer line takes precedence.
(Volume of tank =) $70 \times 40 \times 30$	M1	May be seen in stages.
$= 84000$ (cm^3)	A1	
(Volume of cylinder =) $\pi \times 10^2 \times 30$	M1	May be seen in stages.
$= 9424(\cdot 7\ldots cm^3)$ or $3000\ \pi$ (cm^3)	A1	Accept answers between 9420 and 9426 inclusive.
(Capacity = 84000 – 9424(·7 =) 74575(·…cm^3)	B1	Accept answers between 74574 and 74580 inclusive. FT 'their derived volume of tank'– 'their derived volume of cylinder', provided: • M1 previously awarded • π used when calculating the volume of the cylinder • 'their derived volume of tank' > 'their derived volume of cylinder'.
74·575(…litres)	B1	FT 'their volume/capacity in cm^3' ÷ 1000. Award B1 for a final answer of • 74·6 (litres) • 74·5 (litres) • 74·58 (litres) • 74·57 (litres) • 75 (litres) • 74 (litres) provided from correct workings. This final B1 can be awarded if the volume of the cylinder and tank are converted to litres correctly before the subtraction. An unsupported final answer of 74575(·…cm^3) is awarded M1A1M1A1B1B0. Unsupported answers in the above list is awarded M1A1M1A1B1B1.
14. <u>Alternative method</u>		
(Interior base area of container =) $70 \times 40 - \pi \times 10^2$	*M2*	*Award M1 for an appropriate 70×40 OR $\pi \times 10^2$* ***<u>within a subtraction</u>***
$= 2485(\cdot 8\ldots cm^2)$ (cm^2) or $2800 - 100\pi$	*A1*	*CAO Accept answers between 2485·8 and 2486 inclusive.*
(Capacity of container =) 2485(·8…) × 30	*M1*	*FT 'their derived base area', provided at least M1 previously awarded.*
74575(·…cm^3)	*A1*	*Accept answers between 74574 and 74580 inclusive.*
74·575(…litres)	*B1*	*FT 'their volume/capacity in cm^3' ÷ 1000.* *Award B1 for a final answer of* • *74·6 (litres)* • *74·5 (litres)* • *74·58 (litres)* • *74·57 (litres)* • *75 (litres)* • *74 (litres) provided from correct workings.*

Unit 2: Intermediate Tier	Mark	Comments
15.(a) −3	B1	
15.(b) (0, 7)	B1	
16. $13{\cdot}8^2 = BD^2 + 7{\cdot}3^2$ OR $(BD^2 =)\ 13{\cdot}8^2 - 7{\cdot}3^2$ or equivalent	M1	Check diagram for answers. Note: 190·44 – 53·29 = 137·15
$(BD =)\ \sqrt{13.8^2 - 7.3^2}$ or equivalent	m1	Note: $(BD =)\ \sqrt{137{\cdot}15}$ FT √'their 137·15' for m1 only, provided M1 previously gained.
$(BD =)$ 11·7(1…..) (cm)	A1	CAO. Final answer of BD = 137·15 is M1m0A0. Accept an answer rounded or truncated to at least 1 decimal place. If √137.15 is used correctly for BD in subsequent work, then award this A1 retrospectively. An unsupported answer of 11·7(1…..) (cm) is awarded M1m1A1.
$y = \sin^{-1}\left(\frac{5.5}{11.7}\right)$ or $\sin^{-1}\ \frac{5{\cdot}5 \times \sin 90}{11{\cdot}7}$ or equivalent	M2	Check diagram for answers. FT 'their stated BD' (may be on diagram), provided > 5·5. Award M1 for one of the following: • $\sin y = \left(\frac{5.5}{11.7}\right)$ (= 0·47(0..)) • $\frac{\sin y}{5{\cdot}5} = \frac{\sin 90}{11{\cdot}7}$ or equivalent
y = 28(·0..)	A1	Accept an answer rounded or truncated. An unsupported answer of 28(·0..) is awarded M1m1A1M2A1. Allow correct angles given in radians or gradians:

Method	Radians	Gradians
$\sin^{-1}\ \frac{5{\cdot}5}{11{\cdot}7}$	0·4893…	31·155….
$\sin^{-1}\ \frac{5{\cdot}5 \times \sin 90}{11{\cdot}7}$	0·4337…	30·738….

*16. Alternative method **for first 3 marks*** ***Correct** use of a 'two-step' method.*	*M2*	*A partial trigonometric method is M0.*
(BD =) 11·7(1…..) (cm)	*A1*	
*16. Alternative method **for final 3 marks*** ***Correct** use of a 'two-step' method.*	*M2*	*A partial trigonometric method is M0.*
(y =) 28(·0)	*A1*	*Allow correct angles given in radians or gradians.*

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17. $(x + 8)(x - 5)$	B2	Award B1 for one of the following: • $(x \ldots 8)(x \ldots 5)$ • two brackets which multiply to give $x^2 + 3x + k$ • two brackets which multiply to give $x^2 + mx - 40$.
$(x =) -8$ AND $(x =) 5$	B1	**Strict FT** from their brackets. If no factorising shown, allow the following. B2 for $x + 8 (=0)$ AND $x - 5 (=0)$ (B1) $(x =) -8$ AND $(x =) 5$ (B1) OR B1 for $x - 8 (=0)$ AND $x + 5 (=0)$ (B0) $(x =) 8$ AND $(x =) -5$ (B1) FT OR B1 if only $(x =) -8$ AND $(x =) 5$ seen. (B1)
18. $\frac{a + b}{2} = b - a$	B1	Award B0 for $a + b \div 2 = b - a$ unless brackets are implied in later correct workings.
$a + b = 2(b - a)$	B1	May be implied by correct further work (e.g. $a + b = 2b - 2a$).
$a + b = 2b - 2a$ or $a + 2a = 2b - b$ $(= 3a = b)$	B1	Award final B1 only from convincing work. If no marks, award SC1 for one of the following: • $a + b \div 2 = b - a$ • $\frac{a + b}{2} = a - b$ • sight of $\frac{a + b}{2}$ **AND** $b - a$ • showing the result is true (mean = range) for a pair of values a and b (where $3a = b$) e.g. stating that $a = 3$ and $b = 9$ and that $(9 + 3) \div 2 = 6$ and $9 - 3 = 6$.
18. Alternative method: *Assuming $b = 3a$* *(Mean =) $\frac{a + 3a}{2}$* *$= 2a$* *Range = $3a - a = 2a$*	*M1* *A1* *B1*	*Working must be shown.* *Working must be shown.*
19.(a) $\frac{x}{13.3} = \frac{5.2}{3.8}$ or $\frac{x}{5.2} = \frac{13.3}{3.8}$ or equivalent $x = 18{\cdot}2$	M1 A1	M1 for correct use of scale factor 3·5 or equivalent e.g. $x = 5{\cdot}2 \times \frac{7}{2}$ An unsupported answer of 18·2 is awarded M1A1.

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19.(b) A and C Valid **correct** reason e.g. • For each (of A and C) the length is 1·5 times the width • For each (of A and C) the length is 3/2 times the width • For each (of A and C) the width is 2/3 times the length • The scale factor (of enlargement from A to C) is 2·5 (or equivalent) • The scale factor (of enlargement from C to A) is 0·4 (or equivalent) • The sides are in equal ratios e.g. $\frac{15}{6} = \frac{10}{4}$ (= 2·5) OR $\frac{6}{4} = \frac{15}{10}$ (= 1·5) or equivalent inverse ratios shown to be equal • The (corresponding) lengths and widths are in the same ratio of 5 : 2 • The ratio of the length to the width is 3 : 2 (for each of the rectangles A and C) • 6 × 2·5 = 15cm 4 × 2·5 =10cm.	B1 E1	Answer line takes precedence. Dependent on B1. Allow: Both width and height increase by a factor of 2·5 Do not allow: They have the same scale factor The scale factor is 1·5 The scale factor is 3 : 2.
20.(a) (Berwyn = £) $0{\cdot}6x$ or equivalent	B1	CAO. Must be in terms of x e.g. award B0 for (£)0·6.
20.(b) Sight of (Carys = £)$0{\cdot}3x$ AND (Delyth = £)$0{\cdot}7x$ or equivalent (£)$0{\cdot}3x$ + (£)$0{\cdot}4x$ or equivalent (£)$0{\cdot}7x$ or Delyth or equivalent	B1 B1 B1	Must be seen and in terms of x e.g. award B0 for (£)0·3 and (£)0·7. Final answer of (£)$0{\cdot}7x$ or Delyth must be clearly identified, convincing and from correct working. If no marks awarded or if only the first B1 awarded, then award an additional SC1 for one of the following: • (£)0·3 + (£)0·4 = (£)0·7 (or Delyth) • (£)30 + (£)40 = (£)70 (or Delyth) or equivalent • Carys + Aled = Delyth. Carys + Aled = (£)$0{\cdot}7x$ is awarded full marks provided the first B1 is awarded. If first B1 not awarded, award SC1 for sight of Carys + Aled = (£)$0{\cdot}7x$.