GCSE MARKING SCHEME

SUMMER 2024

GCSE
MATHEMATICS
UNIT 1 – FOUNDATION TIER
3300U10-1

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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.

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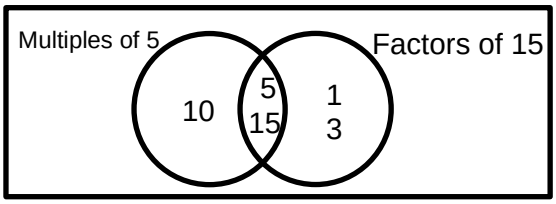
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WJEC GCSE MATHEMATICS

SUMMER 2024 MARKING SCHEME

Unit 1: Foundation Tier	Mark	Comments
1.(a) 562 000	B1	
1.(b) 42 900	B1	Accept forty-two thousand (and) nine hundred
2.(a) pentagon	B1	
2.(b) radius	B1	
3. (Total number of beads =) 3 × 65 + 405 (=) 600 (beads) (Number of beads in one bag =) 600 ÷ 4 (=) 150 (beads)	M1 A1 M1 A1	Award M1 for 195 + 405 FT 'their derived 600' ÷ 4 On FT, if answer is not an integer allow an improper fraction, decimal (rounded or truncated including to a whole number) or with a remainder.
<u>Alternative method:</u> *(Extra beads in fourth bag= 405 – 65 =) 340 (beads)* *(Number of beads to be added to each bag=) 340 ÷ 4* *(=) 85 (beads)* *(Number of beads in one bag = 65 + 85=)150 (beads)*	 *B1* *M1* *A1* *A1*	 *FT 'their 405 – 65'* On FT, if answer is not an integer allow an improper fraction, decimal (rounded or truncated including to a whole number) or with a remainder *FT 65 + 'their 85' provided M1 awarded*
Organisation and Communication Accuracy in 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
4.(a) unlikely	B1	
4.(b) an even chance	B1	
5. Sight of 7(cm) or 70 (mm) AND 4(cm) or 40 (mm) (Perimeter =) 7 + 4 + 7 + 4 (cm) or equivalent 22 cm OR 220 mm	B1 M1 A1	Allow 6·8 to 7·2 (cm) and 3·8 to 4·2 (cm) OR 68 to 72 (mm) and 38 to 42 (mm). May be seen or implied in further work. B0 for opposite sides of different lengths. FT 'their lengths' and 'their widths' for M1 and possibly A1. Units need to be consistent for M1. <u>Correct units</u> for their measurements are required. B1 M1 A0 for answer of 22 with no working and no correct units.

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Unit 1: Foundation Tier	Mark	Comments
6.(a) 103	B1	
6.(b) 2500 1250	B1 B1	FT 'their 2500' ÷ 2
7.(a) 3*k*	B1	Mark final answer
7.(b)(i) (*x* =) 45	B1	Accept embedded solutions unless contradicted by later working. Mark final answer
7.(b)(ii) (*y* =) 11	B1	Accept embedded solutions unless contradicted by later working. Accept *x* instead of *y*. Mark final answer
7.(b)(iii) (*w* =) 9	B1	Accept embedded solutions unless contradicted by later working. Accept *x* instead of *w*. Mark final answer
8.  	B2	B2 for fully correct answer B1 for 3 or 4 correct If any number is duplicated, both entries are counted as incorrect.
9.(a)(i) 49	B1	B0 for 7×7
9.(a)(ii) 9	B1	B0 for 9×9
9.(b)(i) 19·7	B1	CAO B0 for 19·70(0…)
9.(b)(ii) 65·428	B1	CAO B0 for 65·4280(0…)
10. *ABC* = 55(°) drawn in correct position *BC* = 7·4 (cm) drawn in correct position	 B1 B1	**Overlay** Accept 53(°) to 57(°) Accept 7·2 (cm) to 7·6 (cm) Point C is sufficient; line BC need not be drawn.

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Unit 1: Foundation Tier	Mark	Comments
11. 5, 7, 7, 9 (in any order)	B3	Answer boxes take precedence. Four numbers must be given for B3 or B2 to be awarded B3 for 7, 7, 5, 9 B2 for mode = 7 AND total = 28 • 7, 7, a, b where a+ b = 14 and a and b can be any numbers (negative, fractions, decimals, even number or ≥10) e.g. 7, 7, 2, 12 • NOT 7, 7, 7, 7 At least 2 numbers must be given for B1 to be awarded. B1 for mode = 7 OR total = 28 Examples include: • 7,7,7,7 • 7,7,7,14 (mode = 7, total ≠ 28) • 7, 7, blank, blank (mode = 7, total ≠ 28) • 7, 3, 9, 9 (mode ≠ 7, total = 28) • 7, 9, 12, blank (mode ≠ 7, total = 28) B1 for 7,7,14, blank (mode = 7, total = 28) B0 for 7, blank, blank, blank,
12.(a) 0·2 or equivalent	B1	Mark final answer. Accept ·2 and 0·200…
12.(b) 10·44	B1	
13.(a) 0·5 kg	B1	
13.(b) 24 km	B1	
14. (The first three terms are) 4, 9 and 14 (Sum =) 27	B2 B1	May be in any order or in a sequence with other subsequent terms. Award B1 for one of the following: • any two of 4, 9 and 14 given as first three terms e.g. -1, 4, 9 • -1, 4, 9, 14… • 6, 11, 16 (from using $5n + 1$) • $4n$, $9n$, $14n$. FT their unambiguously identified first three terms, provided at least B1 previously awarded (but not from $4n$, $9n$, $14n$). Award all three marks for an unsupported answer of 27.
14. <u>Alternative Method</u> *(Sum =) 5 (1 + 2 + 3) – 3 × 1 or equivalent* *= 30 – 3* *= 27*	*M1* *M1* *A1*	*FT 'their 5 (1 + 2 + 3)' –'their 3 × 1'.*

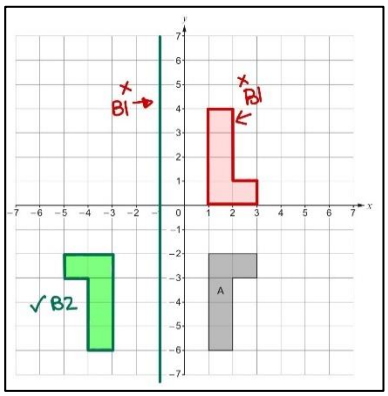
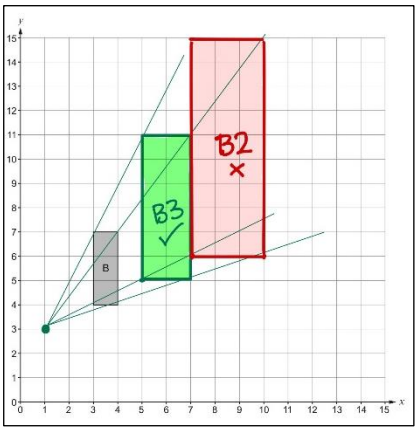
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Unit 1: Foundation Tier	Mark	Comments
15. (x = 180 –) 90 – 64 or equivalent = 26(°) (y =) 26(°) (z =) $\frac{180 - 26}{2}$ = 77(°)	 M1 A1 B1 M1 A1	Check diagram for answers but answer line takes precedence. FT y = 'their x'. FT 'their y', provided $y \neq 90°$ or 60°.
16.(a) A correct explanation given. e.g. '(equal) groups do not reach 20', '12 to 15 and 16 to 19 so no 20', ' to reach 20 the groups are not equal' 'it only goes up to 19' '20 not included'.	E1	Allow any unambiguous explanation. Do not accept: 'because there's only 20 attempts'. Award E1 if incorrect values are given in the table but correct explanation given.
16.(b) (0 to 6) 7 to **13** **14** to 20	B1	Answer in table takes precedence.
16.(c)(i) $\frac{17}{100}$ or equivalent ISW	B1	B0 for incorrect notation e.g. '17 in 100', '17 out of 100', '17:100' etc.
16.(c)(ii) A correct explanation given e.g. 'the eleven competitors might have all scored 20', 'only one of them (might have) scored 19', 'we don't know how many competitors scored 19' 'the probability of scoring 18, 19 or 20 is $\frac{11}{100}$' 'the 11 could include (the scores of) 18 and 20' 'it doesn't tell you the exact score of all 11 competitors'	E1	Allow any unambiguous explanation. E0 for mixing number of competitors and number of points scored. e.g. '11 points were scored for 18, 19, 20' '18, 19 or 20 people could have scored 11'.
17.(a) $\frac{96}{300}$ (× 100) or equivalent = 32(%)	M1 A1	M1 for sight of 0·32. Note: other complete valid methods to look out for include: • 96 ÷ 3 • 10% + 10% + 10% + 1% + 1% (= 30 + 30 + 30 + 3 + 3) • (96 out of 300 =) 32 out of 100 = 32(%).
17.(b) (£)48 ÷ 8 or (£)6 (£)6 AND (£)42 ISW	M1 A1	Sight of an appropriate 6 (or 42) implies M1. Allow in any order. Allow (£)6 : (£)42 or (£)42 : (£)6.

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Unit 1: Foundation Tier	Mark	Comments
18. (Probability of winning score =) $\frac{3}{20}$ or equivalent	B2	Award B2 for sight of • $\frac{1}{4} \times \frac{3}{5}$ • '3 winners out of 20' • the 3 winning combinations/scores clearly identified in a list/table of the 20 possible combinations/scores. B2 may be implied in later workings. Award B1 for one of the following: • for convincing identification of the 20 combinations/scores, for example: ✓ sight of 20 ✓ 4 × 5 ✓ showing all 20 correct combinations 10 + 1,10 + 2...with no extras ✓ all 20 correct scores listed with no extras ✓ completed sample space drawn (4 by 5) ✓ sight of $\frac{1}{4}$ AND $\frac{3}{5}$ or equivalent. • identifying the three correct possible winning scores (43, 44, 45) with no extras • identifying the three correct winning combinations (40 + 3, 40 + 4, 40 + 5) with no extras • $\frac{3}{x}$ provided $x > 3$ and correct winning combinations/scores identified • $\frac{y}{20}$ provided with $y < 20$ • $\frac{3}{20}$ from incorrect winning combinations or scores identified • strict FT from 'their list' provided clearly stated $\frac{\text{'their number of winning scores'}}{\text{'their total number of possibles scores'}}$
(Number of winners =) $\frac{3}{20} \times 100$ or equivalent	M1	Award M1 for $\frac{1}{4} \times \frac{3}{5} \times 100$. May be implied e.g. 100 ÷ 20 = 5, 5 × 3 = 15. FT 'their probability of winning score' × 100, provided 'their probability of winning score' < 1, or ≠ $\frac{x}{100}$. M0 awarded if 'their probability of winning score' is simplified incorrectly.
= 15	A1	May be implied by '15 out of 100' or equivalent. If 15 is not seen but final answer of £15 is given (i.e. 'people' confused with 'money') then allow only M1A0. Answer must be whole number.
(Profit =) (£)100 – 15 × (£)5 OR (£)85 – 15 × (£)4	M2	FT 'their number of winners', provided ≠ 3 and <100. Award M1 for one of the following: • 15 × (£)5 • an appropriate sight of (£)75 • 'their number of winners'× (£)5 • 'their number of winners'× (£)5 evaluated correctly • (£)100 – (£)15 AND 15 × (£)4 • (£)100 – 'their number of winners' × (£)1 AND 'their number of winners' × (£)4.
= (£)25	A1	FT provided M2 (not M1M1) previously awarded. **Unsupported** answer of (£)25 is awarded B2 M1A1M2A1.

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Unit 1: Foundation Tier	Mark	Comments
18. <u>Alternative method for the final 5 marks</u> ***<u>Must clearly be working with groups of 20 throughout</u>*** *20 × (£)1 – 3 × (£)5*	*M2*	*Method must be seen for M2.* *FT 'their 20' × (£)1 – 'their 3' × (£)5.*
(£)5	*A1*	*May be implied in later working.*
× 5	*m1*	*FT 100 ÷ 'their 20'*
=(£)25	*A1*	
19.(a) Correct reflection.  	B2	**<u>Overlay</u>** Award B1 for one of the following: • line $x = -1$ drawn • correct reflection in line $y = -1$ • a correct reflection with only one other incorrect reflection seen.
19.(b) Correct enlargement.  	B3	**<u>Overlay</u>** Award B2 for one of the following: • an enlargement of scale factor 2 with correct orientation but not from centre (1,3) • an enlargement of scale factor 3 from centre (1,3) • 4 correct vertices plotted but not joined. Award B1 for one of the following: • an enlargement of scale factor 2 with incorrect orientation • sight of appropriate 4 'rays' from point (1,3) • an enlargement of scale factor 3 with correct orientation but not from centre (1,3) • an enlargement of scale factor 2 of one of the sides, <u>with correct orientation</u>, from centre (1,3). (The side must be part of a rectangle).

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GCSE MARKING SCHEME

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UNIT 2 – FOUNDATION TIER
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1. 1.78 4 5.76 121	B1 B1 B1 B1	
2.(a) 196	B1	Allow 14^2.
2.(b) 13	B1	
2.(c) $\frac{280 + 410}{2}$ (= $\frac{690}{2}$) OR $280 + \frac{410 - 280}{2}$ (= $280 + \frac{130}{2}$) OR $410 - \frac{410 - 280}{2}$ (= $410 - \frac{130}{2}$) OR writing numbers between 280 and 410 AND attempting to identify the middle number. 345 (m)	M1 A1	May be seen in stages. Numbers could be multiples of 5 or 10. Do not accept multiples of 20. If no marks, award SC1 for: • an answer of 485 or 550 • sight of 345 but not as a final answer.
2.(c) W Accuracy of writing	W1	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.
3.(a)(i) (regular) hexagon	B1	Do not accept heptagon.
3.(a)(ii) trapezium	B1	
3.(b) cuboid	B1	
3.(c)(i) 2	B1	
3.(c)(ii) 0	B1	
4.(a) $\frac{55}{66}$ $\frac{35}{42}$	B2	B1 for either: • two correct answers circled, <u>with one</u> incorrect answer. • one correct answer circled, <u>with up to one</u> incorrect answer.
4.(b) 0·05	B1	Accept $\frac{1}{20}$. B0 for $1 \div 20$.
4.(c) 3 6 AND 5 7 OR 5 7 AND 3 6	B2	B1 for an answer of either: • 3 7 AND 5 6 • 5 6 AND 3 7
5. (Second term =) 15 (Third term =) 19	B1 B1	 FT 'their 15' + 4 correctly evaluated.
6. $14d$ d	B1 B1	 Accept $1d$.

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Unit 2: Foundation Tier	Mark	Comments
7.(a) A correct explanation, e.g. • 'She hasn't used BIDMAS/ BODMAS/ Order of Operations'. • 'You must multiply before you add' • 'She should have multiplied first' • 'She has added the 10 and the 4 first, then multiplied by 9'	E1	Accept '10 + 36 = 46'. Award E0 for: • an unsupported 46. • '10 + 4 x 9 = 46'. • 'she added 10 and 4 together' • a correct explanation given but later contradicted • a correct explanation given with an incorrect answer to the calculation
7.(b) A correct explanation, e.g. • 'He has divided by 2 not divided by a half'. • 'He has worked out a half of 20 (not divided 20 by a half)'. • 'He should have multiplied by 2'. • 'He should have multiplied not divided'. • 'He should have divided by a half (not by 2)'	E1	Accept '20 ÷ ½ = 40' or '20 × 2 = 40'. Award E0 for: • a correct explanation given but later contradicted • an unsupported 40 • 'he shouldn't have divided by 2' • 'there are more than 10 halves in 20' • a correct explanation given with an incorrect answer to the calculation
7.(c) A correct explanation, e.g. • 'She hasn't calculated the difference between the biggest number and the smallest number'. • 'She should have done 20 – 1'	E1	Accept '20 - 1 = 19'. Allow: • 'range = largest – smallest' • 'she didn't put the numbers in order first (before finding the difference between the end numbers)' • '11 isn't the biggest number and 7 isn't the smallest number' Award E0 for: • an unsupported 19 • 1 – 20 (unless = 19 also seen) • '11 isn't the biggest number' • '7 isn't the smallest number' • 'smallest take away the biggest' • a correct explanation given but later contradicted. • a correct explanation given with an incorrect answer to the calculation
7.(d) A correct explanation, e.g. • 'They should halve (1/5 of the number to work out 1/10 of the number)'. • 'They should divide by 2'. • 'They should multiply by 5 then divide by 10'.	E1	Accept equivalent explanations.
8. (Cards with red stickers are / Multiples of 6 are) 6, 12, 18, … (Cards with blue stickers are / Multiples of 8 are) 8, 16, 24, … (Cards with blue and red stickers are / Numbered cards are) 24 AND 48 only	B1 B1 B1	Correctly listing at least 3 multiples of 6. Ignore any additional incorrect multiples. Correctly listing at least 3 multiples of 8. Ignore any additional incorrect multiples. CAO. Accept any unambiguous indication. The final B1 implies the previous two B1 marks. If no marks awarded, award SC1 for sight of an answer of 24 OR 48.

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Unit 2: Foundation Tier	Mark	Comments
8. OC Organisation and Communication	OC1	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.
9.(a) $x = 100$	B1	Mark final answer. Allow B1 for a correct embedded answer BUT B0 if contradicted by $x \neq 100$.
9.(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 $m \neq 4$.
10. 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).
11.(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.
11.(b) 111(°)	B1	**Strict FT** from their drawing.

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Unit 2: Foundation Tier	Mark	Comments
12.(a) 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.
12.(b) Sight of 6·3 OR 630 0·46 (m) OR 46 (cm)	B1 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.
13.(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.
13.(b) (Volume =) 7 × 5 × 3 = 105 cm^3	M1 A1 U1	M1 must be for a complete correct method. e.g. any further manipulation to 7 × 5 × 3 is M0. CAO Unsupported final answer of 105 is awarded M1A1U0. Independent of other marks (e.g. M0 could have been previously awarded or no volume given). Unsupported answer of 105cm^3 is awarded M1A1U1.

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Unit 2: Foundation Tier	Mark	Comments
14.(a) $1 - (0{\cdot}54 + 0{\cdot}12 + 0{\cdot}25)$ or equivalent $= 0{\cdot}09$ or equivalent	 M1 A1	Answer in table takes precedence. Award M1 for complete method. Note: $1 - 0{\cdot}91$ Mark final answer. Unsupported answer of $0{\cdot}09$ or equivalent is awarded M1A1.
14.(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.
15. $51{\cdot}3 = 2{\cdot}3 + 9{\cdot}8\ (\times)\ t$ or equivalent $49 = 9{\cdot}8\ (\times)\ t$ or equivalent $t = 5$	M1 A1 A1	 Implies M1. FT only from $k = 9{\cdot}8\ (\times)\ t$. Mark final answer. 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 $53{\cdot}6 = 9{\cdot}8\ (\times)\ t$.

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Unit 2: Foundation Tier	Mark	Comments
16. (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.
17. (Area =) π × $8{\cdot}7^2$ = 238 (cm^2)	M1 A2	Award A1 for sight of one of the following: • 237(·…) • 75 $^{69}/_{100}$ π • $^{7569}/_{100}$ π
18. (Distribution = 360 – 60 – 138 =) 162(°) $\frac{162}{360}$ or $\frac{9}{20}$ or equivalent = 0·45	B1 M1 A1	May be seen on diagram. FT $\frac{\text{'their stated 162'}}{360}$, provided obtuse. 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.
18. Alternative method *1 – $\frac{198}{360}$ or 1 – $\frac{11}{20}$ or equivalent* *= 0·45*	*M2* *A1*	*Award M1 for 1 – $\frac{\text{'their 138 + 60'}}{360}$.* *Answer must be given as a decimal.* *Mark final answer.* *FT provided 1 – 'their fraction < 1'.*

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GCSE MARKING SCHEME

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MATHEMATICS
UNIT 1 – INTERMEDIATE TIER
3300U30-1

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SUMMER 2024 MARKING SCHEME

Unit 1: Intermediate Tier	Mark	Comments
1.(a)(i) 81 000 ISW	B2	Accept $8{\cdot}1 \times 10^4$. B1 for sight of one of the following: • 81 • 1000.
1.(a)(ii) 0·2 or equivalent	B1	Mark final answer. Accept ·2 and 0·200…
1.(a)(iii) 10·44	B1	
1.(b) $\frac{1}{14}$	B2	Mark final answer. Award B1 for the appropriate sight of one of the following: • any fraction equivalent to $\frac{1}{14}$, e.g. $\frac{2}{28}$ • $\frac{1}{7} \times \frac{1}{2}$.
2.(a) 0·5 kg	B1	
2.(b) 24 km	B1	
3. (The first three terms are) 4, 9 and 14	B2	May be in any order or in a sequence with other subsequent terms. Award B1 for one of the following: • any two of 4, 9 and 14 given as first three terms e.g. -1, 4, 9 • -1, 4, 9, 14… • 6, 11, 16 (from using $5n + 1$) • $4n$, $9n$, $14n$.
(Sum =) 27	B1	FT their unambiguously identified first three terms, provided at least B1 previously awarded (but not from $4n$, $9n$, $14n$). Award all three marks for an unsupported answer of 27.
3. Alternative Method *(Sum =) 5 (1 + 2 + 3) – 3 × 1 or equivalent* *= 30 – 3* *= 27*	*M1* *M1* *A1*	*FT 'their 5 (1 + 2 + 3)' –'their 3 × 1'.*
4. (x = 180 –) 90 – 64 or equivalent = 26(°) (y =) 26(°) (z =) $\frac{180 - 26}{2}$ = 77(°)	 M1 A1 B1 M1 A1	Check diagram for answers but answer line takes precedence. FT y = 'their x'. FT 'their y', provided $y \neq 90°$ or 60°.

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Unit 1: Intermediate Tier	Mark	Comments
5.(a) A correct explanation given. e.g. '(equal) groups do not reach 20', '12 to 15 and 16 to 19 so no 20', ' to reach 20 the groups are not equal' 'it only goes up to 19' '20 not included'.	E1	Allow any unambiguous explanation. Do not accept: 'because there's only 20 attempts'. Award E1 if incorrect values are given in the table but correct explanation given.
5.(b) (0 to 6) 7 to **13** **14** to 20	B1	Answer in table takes precedence.
5.(c)(i) $\frac{17}{100}$ or equivalent ISW	B1	B0 for incorrect notation e.g. '17 in 100', '17 out of 100', '17:100' etc.
5.(c)(ii) A correct explanation given e.g. 'the eleven competitors might have all scored 20', 'only one of them (might have) scored 19', 'we don't know how many competitors scored 19' 'the probability of scoring 18, 19 or 20 is $\frac{11}{100}$' 'the 11 could include (the scores of) 18 and 20' 'it doesn't tell you the exact score of all 11 competitors'	E1	Allow any unambiguous explanation. E0 for mixing number of competitors and number of points scored. e.g. '11 points were scored for 18, 19, 20' '18, 19 or 20 people could have scored 11'.
6.(a) $\frac{96}{300}$ (× 100) or equivalent = 32(%)	M1 A1	M1 for sight of 0·32. Note: other complete valid methods to look out for include: • 96 ÷ 3 • 10% + 10% + 10% + 1% + 1% (= 30 + 30 + 30 + 3 + 3) • (96 out of 300 =) 32 out of 100 = 32(%).
6.(b) (£)48 ÷ 8 or (£)6 (£)6 AND (£)42 ISW	M1 A1	Sight of an appropriate 6 (or 42) implies M1. Allow in any order. Allow (£)6 : (£)42 or (£)42 : (£)6.
7.(a)(i) $7(2a - 5)$	B1	Mark final answer. Allow: • $7 \times (2a - 5)$ • $-7(-2a + 5)$ • $7(2a + -5)$ • $(2a - 5) \times 7$ • $(2a - 5)7$.
7.(a)(ii) $x(5 + x)$	B1	Mark final answer. Allow: • $x(x + 5)$ • $1x(5 + x)$ • $(1)x \times (5 + x)$ • $(5 + x)x$ • $(5 + x) \times x$.

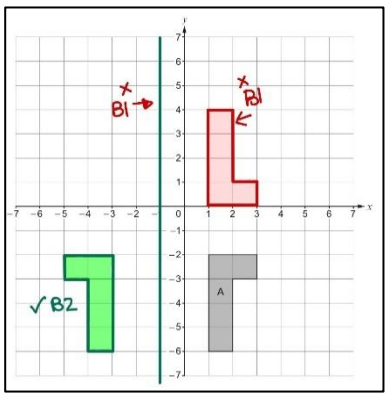
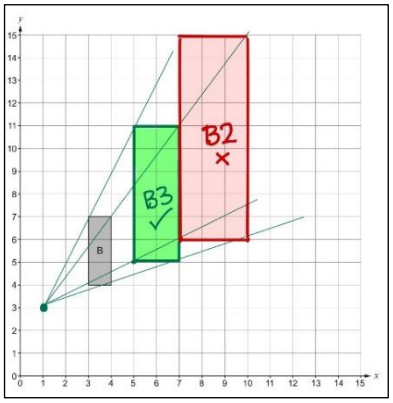
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Unit 1: Intermediate Tier	Mark	Comments
7.(b) $\frac{x}{3} = 4$ $x = 12$	B1 B1	 FT only from $\frac{x}{3} = k$, provided $k \neq 9$. An unsupported answer of 12 is awarded B1B1. $x = 4 \times 3$ is awarded B1B0. Allow B1B1 for a correct embedded answer BUT only B1B0 if contradicted by $x \neq 12$.
7.(b) Alternative method $x + 15 = 27$ $x = 12$	*B1* *B1*	 *FT only from $x + 5 = 27$ ($x = 22$) or $x + 15 = 9$ ($x = -6$)* *An unsupported answer of 12 is awarded B1B1.* *$x = 27 - 15$ is awarded B1B0.* *Allow B1B1 for a correct embedded answer BUT only B1B0 if contradicted by $x \neq 12$.*

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Unit 1: Intermediate Tier	Mark	Comments
8. (Probability of winning score =) $\frac{3}{20}$ or equivalent	B2	Award B2 for sight of • $\frac{1}{4} \times \frac{3}{5}$ • '3 winners out of 20' • the 3 winning combinations/scores clearly identified in a list/table of the 20 possible combinations/scores. B2 may be implied in later workings. Award B1 for one of the following: • for convincing identification of the 20 combinations/scores, for example: ✓ sight of 20 ✓ 4 × 5 ✓ showing all 20 correct combinations 10 + 1,10 + 2...with no extras ✓ all 20 correct scores listed with no extras ✓ completed sample space drawn (4 by 5) ✓ sight of $\frac{1}{4}$ AND $\frac{3}{5}$ or equivalent. • identifying the three correct possible winning scores (43, 44, 45) with no extras • identifying the three correct winning combinations (40 + 3, 40 + 4, 40 + 5) with no extras • $\frac{3}{x}$ provided $x > 3$ and correct winning combinations/scores identified • $\frac{y}{20}$ provided with $y < 20$ • $\frac{3}{20}$ from incorrect winning combinations or scores identified • strict FT from 'their list' provided clearly stated $\frac{\text{'their number of winning scores'}}{\text{'their total number of possibles scores'}}$
(Number of winners =) $\frac{3}{20} \times 100$ or equivalent	M1	Award M1 for $\frac{1}{4} \times \frac{3}{5} \times 100$. May be implied e.g. 100 ÷ 20 = 5, 5 × 3 = 15. FT 'their probability of winning score' × 100, provided 'their probability of winning score' < 1, or $\neq \frac{x}{100}$. M0 awarded if 'their probability of winning score' is simplified incorrectly.
= 15	A1	May be implied by '15 out of 100' or equivalent. If 15 is not seen but final answer of £15 is given (i.e. 'people' confused with 'money') then allow only M1A0. Answer must be whole number.
(Profit =) (£)100 – 15 × (£)5 OR (£)85 – 15 × (£)4	M2	FT 'their number of winners', provided ≠ 3 and <100. Award M1 for one of the following: • 15 × (£)5 • an appropriate sight of (£)75 • 'their number of winners'× (£)5 • 'their number of winners'× (£)5 evaluated correctly • (£)100 – (£)15 AND 15 × (£)4 • (£)100 – 'their number of winners' × (£)1 AND 'their number of winners' × (£)4.
= (£)25	A1	FT provided M2 (not M1M1) previously awarded. **An unsupported** answer of (£)25 is awarded B2 M1A1M2A1.

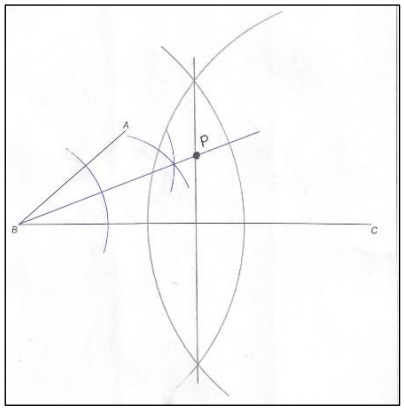
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Unit 1: Intermediate Tier	Mark	Comments
8. Alternative method for the final 5 marks ***Must clearly be working with groups of 20 throughout*** *20 × (£)1 – 3 × (£)5* *(£)5* *× 5* *=(£)25*	*M2* *A1* *m1* *A1*	*Method must be seen for M2.* *FT 'their 20' × (£)1 – 'their 3' × (£)5.* *May be implied in later working.* *FT 100 ÷ 'their 20'*
9.(a) Correct reflection.  	B2	**Overlay** Award B1 for one of the following: • line $x = -1$ drawn • correct reflection in line $y = -1$ • a correct reflection with only one other incorrect reflection seen.
9.(b) Correct enlargement.  	B3	**Overlay** Award B2 for one of the following: • an enlargement of scale factor 2 with correct orientation but not from centre (1,3) • an enlargement of scale factor 3 from centre (1,3) • 4 correct vertices plotted but not joined. Award B1 for one of the following: • an enlargement of scale factor 2 with incorrect orientation • sight of appropriate 4 'rays' from point (1,3) • an enlargement of scale factor 3 with correct orientation but not from centre (1,3) • an enlargement of scale factor 2 of one of the sides, with correct orientation, from centre (1,3). (The side must be part of a rectangle).
10.(a) 0·25	B1	

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Unit 1: Intermediate Tier	Mark	Comments
10.(b) $\frac{80}{40 \times 0.5}$ 4 $\frac{2}{0.5}$ 4 $\frac{80}{20}$ 4 $\frac{79}{40 \times 0.5}$ 3·95 or 4 or $3\frac{19}{20}$ $\frac{79}{20}$ 3·95 or 4 or $3\frac{19}{20}$ $\frac{79.3}{20}$ 3·965 or 3·97 or 4 $\frac{79.34}{20}$ 3·967 or 3·97 or 4	 M1 A1	May be seen in stages. Award M1 for appropriate calculation seen. Award A1 for the correct estimate for the calculation seen. An unsupported answer is M0A0.
10.(c) $4\frac{1}{2}$ or 4·5 or $\frac{9}{2}$	B3	Mark final answer. Award B2 for an unsimplified evaluation as a single fraction or mixed number e.g. • $4\frac{7}{14}$ • $3\frac{21}{14}$ • $\frac{63}{14}$ • $\frac{441}{98}$ or equivalent • 4 + ½. FT for one of the following: • adding 'their improper fractions' (which incorporate the entire numbers) provided fractions have a common denominator (one numerator must be correct) and answer given in a (proper or improper) simplified form • 3 + 'their fractions' evaluated correctly and in a simplified form, provided fractions have a common denominator (one numerator must be correct) • 'their 3' + 1·5 (or equivalent) in a simplified form • a + ½ (or equivalent in its simplified form) evaluated provided ½ has come from two fractions with a common denominator (e.g. $\frac{10}{14} + \frac{11}{14} = \frac{21}{14} = 1\frac{7}{14} + 3 = 3\frac{1}{2}$). Award B1 for sight of two fractions with a common denominator (allow an error in one numerator) e.g. • (1) $\frac{10}{14}$ + (2) $\frac{11}{14}$ • $\frac{24}{14} + \frac{39}{14}$ • $\frac{168}{98} + \frac{273}{98}$ or equivalent. An unsupported answer of $4\frac{1}{2}$ or 4·5 or $\frac{9}{2}$ is awarded B3.

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Unit 1: Intermediate Tier	Mark	Comments
11. (Area of triangle *ABC* or area of cross-section =) $\frac{9 \times 10}{2}$ $= 45\ (cm^2)$ (Volume of prism =) 45×20 $= 900\ (cm^3)$	M1 A1 M1 A1	 May be seen in later working. FT 'their area of cross section'. CAO. An unsupported answer of 900 (cm^3) is awarded M1A1M1A1.
11. Alternative method *(Volume of prism =)* $\frac{9 \times 10 \times 20}{2}$ $= 900\ (cm^3)$	M2 A2	*CAO.* *A1 for sight of 1800/2 or 9 × 100 or 90 × 10 or 45 × 20 or equivalent (i.e.* ***one*** *step left to carry out)*
11. 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
12. Correct construction of bisector of angle *ABC* Correct construction of perpendicular bisector of *BC* Correct position of point *P*  	B1 B1 B1	Correct construction arcs (initial and secondary) and a line joining *B* to the point of intersection of the arcs must be seen or an alternative valid method. Two correct pairs of intersecting construction arcs and a line joining both of these points of intersection must be seen. CAO. Award B1 for the correct point of intersection and not labelled *P*, provided no other incorrect points are indicated. (May be awarded from previous B0B0.)

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Unit 1: Intermediate Tier	Mark	Comments
13. Sight of $7(x + 8)$ or equivalent **AND** Sight of $3(x + 1)$ or equivalent $7(x + 8) + 3(x + 1) = 89$ or equivalent $7x + 56 + 3x + 3 = 89$ $10x = 30$ $x = 3$	 B1 B1 B1 B1 B1	Check diagram for answers. Brackets must be seen unless implied in later correct working. FT 'their expressions' provided of equivalent difficulty. Equating the sum of their two area expressions to 89. Correct expansion in an equation. FT only from $ax \pm b \pm cx \pm d = k$, provided working with area. FT from any equation of the form $fx = g$. Answer must be > –1 on FT. Accept an answer rounded, truncated, or as an improper fraction (if not whole number) on FT. Mark final answer. If the first B0 or B1 awarded, then award an additional SC2 for $x = 3$ clearly identified as a final answer if no correct equation shown. Award full marks if $x = 3$ given and correct equation shown. If an incorrect equation shown and correct answer on FT given (with or without workings shown), award the final B0B1B1 marks.
13. <u>Alternative method</u> *Sight of $7(x + 8 + 3)$ or equivalent* ***AND*** *Sight of $3(7 – 1 – x)$ or equivalent.* *$7(x + 8 + 3) – 3(7 – 1 – x) = 89$ or equivalent.* *$7x + 77 – 18 + 3x = 89$* *$10x = 30$* *$x = 3$*	 *B1* *B1* *B1* *B1*	*Check diagram for answers.* *Brackets must be seen unless implied in later correct working.* *FT 'their expressions' provided of equivalent difficulty.* *Equating the difference of their two area expressions to 89.* *Correct expansion in an equation.* *FT only from $ax \pm b \pm cx \pm d = k$, provided working with area.* *FT from any equation of the form $fx = g$.* *Accept an answer rounded, truncated, or as an improper fraction (if not whole number) on FT.* *Mark final answer.* *If the first B0 or B1 awarded, then award an additional SC2 for $x = 3$ clearly identified as a final answer if no correct equation shown.* *Award full marks if $x = 3$ given and correct equation shown.* *If an incorrect equation shown and correct answer on FT given (with or without workings shown), award the final B0B1B1 marks.*

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Unit 1: Intermediate Tier	Mark	Comments
14. (LCM of 10 and 18 =) 90 or equivalent, e.g. $2 \times 3 \times 3 \times 5$ or $2 \times 9 \times 5$ (HCF of 30 and 72 =) 6 or equivalent, e.g. 2×3 $n = 15$	B2 B2 B1	B1 for any other common multiple identified e.g. 180, 270 etc. B1 for any other common factor identified i.e. 2, 3, . Do not accept 1. B2 B2 B0 for 90/6. FT only if at least one B2 gained. If at least one B2 awarded for correct products seen but incorrectly evaluated LCM or HCF, then B0 is awarded as the final mark. e.g. award B2 B2 B0 for $2 \times 3 \times 3 \times 5 = 90$ and $2 \times 3 = 5$, $n = 90/5 = 18$ award B1 B2 B0 for LCM = 180 and $2 \times 3 = 5$, $n = 180/5 = 36$. Accept an answer rounded, truncated, or as an improper fraction if n is not an integer. If no marks awarded, award one of the following: • SC2 for a final answer of $\frac{2}{360}$ or $\frac{1}{180}$ equivalent (from reversing LCM and HCF) • SC2 for a final answer of $\frac{6}{90}$ or $\frac{1}{15}$ equivalent (answers reversed). • SC1 for sight of LCM = 2 **AND** HCF = 360 (from reversing LCM and HCF). An unsupported 15 is awarded B2B2B1.
15.(a) $\frac{5}{8}$ on 'Bus B' branch. $\frac{1}{2}$ or $\frac{4}{8}$ or 0·5 on **all** 'seat branches'	 B1 B1	Numerator and denominator must be integers. Allow any equivalent to $\frac{5}{8}$ e.g. 0·625. Do not allow 0·63. Allow any equivalent to $\frac{1}{2}$.
15.(b) $\frac{5}{8} \times \frac{1}{2}$ or equivalent $= \frac{5}{16}$ or $\frac{20}{64}$ or $\frac{25}{80}$ or equivalent ISW	M1 A1	FT 'their $\frac{5}{8}$' × 'their $\frac{1}{2}$' provided both values < 1. Do not allow rounded or truncated answers if decimal given. Numerator and denominator must be integers.
16.(a) $5{\cdot}7 \times 10^{-3}$	B1	
16.(b) 4×10^{6}	B2	Mark final answer. Award B1 for one of the following: • sight of 4 000 000 • equivalent correct value but not in standard form e.g. $0{\cdot}4 \times 10^{7}$.

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Unit 1: Intermediate Tier	Mark	Comments
17. (Average speed =) $\frac{x + 36}{1 + 2} = 42$ or equivalent. OR (Total distance =) $x + 36 = 3 \times 42$ or equivalent. $(x =)\ 90$ ISW	M2 A1	Must be a complete and correct method for M2. Award M1 for sight of one of the following: • $\frac{x + 36}{1 + 2}$ • $\frac{x + 36}{3}$ • $\frac{x + 36}{180}$ (mins) • 3×42 • an appropriate 126. CAO. An unsupported answer of 90 is awarded M2A1. If no marks, award SC1 for a final answer of $x = 48$ (from working with 2 hours).
18. Sight of $2x + 3y = 13$ AND $8x - 3y = 22$ Method to eliminate one variable e.g. (equal coefficients **AND)** appropriate intention to add or subtract or use a method of substitution. First variable found $x = 3{\cdot}5$ or $y = 2$ or equivalent Second variable found (Perimeter of triangle = 3·5 + 3·5 + 2 =) 9 (cm)	B1 M1 A1 A1 B1	Award B1 for sight of $(2x + 3y) + (8x - 3y) = 13 + 22$. May be implied in later working. FT 'their equations' if of equivalent difficulty. If equating coefficients, allow one error in one term (not the term with equal coefficients) e.g. the blue terms in the examples below. In the below examples, an appropriate intention to add or subtract is shown by sight of • $10x$ OR 35 or equivalent • $15y$ OR 30 • $30y$ OR 60 or equivalent. Sight of $10x = 35$ implies B1M1. CAO. Award A1 for $2x = 7$. FT substitution of their '1st variable' if M1 gained. Accept an answer rounded, truncated or as an improper fraction (if not whole number) on FT, provided > 0. FT 'their derived x and y', provided an algebraic method is used and both > 0. If the first B0 or B1 awarded, then award an additional SC1 for one of the following: • sight of $x = 3{\cdot}5$ AND $y = 2$ (if M0 awarded) • an unsupported answer of 9 (cm).

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GCSE MARKING SCHEME

SUMMER 2024

GCSE
MATHEMATICS
UNIT 2 – INTERMEDIATE TIER
3300U40-1

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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.

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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) $0{\cdot}55 \times 42{\cdot}8$ or equivalent. $= 23{\cdot}54$	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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Unit 2: Intermediate Tier	Mark	Comments
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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Unit 2: Intermediate Tier	Mark	Comments
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 $53{\cdot}6 = 9{\cdot}8\ (\times)\ t$.

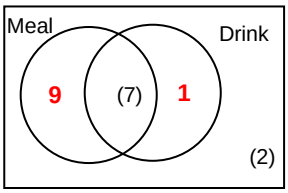
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Unit 2: Intermediate Tier	Mark	Comments
8. (Time difference =) 16 (hours) or 960 (minutes) (One third of 16 hours =) $\frac{1}{3}$ × 16 (hours) or $\frac{1}{3}$ × 960 (minutes) or equivalent 5 (hours) 20 (minutes)	B1 M1 A1	FT 'their time difference' 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 =) $2 \times \pi \times 38$ or $\pi \times 76$ 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.

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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.

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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)'.

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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.

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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.*

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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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Unit 2: Intermediate Tier	Mark	Comments
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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Unit 2: Intermediate Tier	Mark	Comments
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 = (£)$0{\cdot}7x$.

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GCSE MARKING SCHEME

SUMMER 2024

GCSE
MATHEMATICS
UNIT 1 – HIGHER TIER
3300U50-1

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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.

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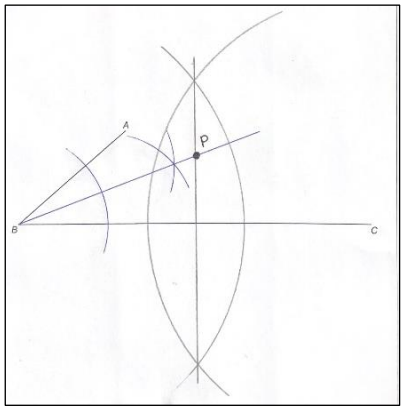
SUMMER 2024 MARKING SCHEME

<table>
<tr><th>Unit 1: Higher Tier</th><th>Mark</th><th>Comments</th></tr>
<tr><td>1.(a) 0·25</td><td>B1</td><td></td></tr>
<tr><td>1.(b)
<table><tr><td>$\frac{80}{40 \times 0.5}$</td><td>4</td></tr><tr><td>$\frac{2}{0.5}$</td><td>4</td></tr><tr><td>$\frac{80}{20}$</td><td>4</td></tr><tr><td>$\frac{79}{40 \times 0.5}$</td><td>3·95 or 4 or $3\frac{19}{20}$</td></tr><tr><td>$\frac{79}{20}$</td><td>3·95 or 4 or $3\frac{19}{20}$</td></tr><tr><td>$\frac{79.3}{20}$</td><td>3·965 or 3·97 or 4</td></tr><tr><td>$\frac{79.34}{20}$</td><td>3·967 or 3·97 or 4</td></tr></table></td><td>M1
A1</td><td>May be seen in stages.
Award M1 for appropriate calculation seen.
Award A1 for the correct estimate for the calculation seen.
An unsupported answer is M0A0.</td></tr>
</table>

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Unit 1: Higher Tier	Mark	Comments
1.(c) $4\frac{1}{2}$ or 4·5 or $\frac{9}{2}$	B3	Mark final answer. Award B2 for an unsimplified evaluation as a single fraction or mixed number e.g. • $4\frac{7}{14}$ • $3\frac{21}{14}$ • $\frac{63}{14}$ • $\frac{441}{98}$ or equivalent • 4 + ½. FT for one of the following: • adding 'their improper fractions' (which incorporate the entire numbers) provided fractions have a common denominator (one numerator must be correct) and answer given in a (proper or improper) simplified form • 3 + 'their fractions' evaluated correctly and in a simplified form, provided fractions have a common denominator (one numerator must be correct) • 'their 3' + 1·5 (or equivalent) in a simplified form • a + ½ (or equivalent in its simplified form) evaluated provided ½ has come from two fractions with a common denominator (e.g. $\frac{10}{14}+\frac{11}{14}=\frac{21}{14}=1\frac{7}{14}+3=3\frac{1}{2}$). Award B1 for sight of two fractions with a common denominator (allow an error in one numerator) e.g. • (1) $\frac{10}{14}$ + (2) $\frac{11}{14}$ • $\frac{24}{14}+\frac{39}{14}$ • $\frac{168}{98}+\frac{273}{98}$ or equivalent. An unsupported answer of $4\frac{1}{2}$ or 4·5 or $\frac{9}{2}$ is awarded B3.

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Unit 1: Higher Tier	Mark	Comments
2. (Area of triangle *ABC* or area of cross-section =) $\frac{9 \times 10}{2}$	M1	
$= 45\ (cm^2)$	A1	May be seen in later working.
(Volume of prism =) 45×20	M1	FT 'their area of cross section'.
$= 900\ (cm^3)$	A1	CAO An unsupported answer of 900 (cm^3) is awarded M1A1M1A1.
2. Alternative method *(Volume of prism =)* $\frac{9 \times 10 \times 20}{2}$	*M2*	
$= 900\ (cm^3)$	*A2*	*CAO* *A1 for sight of 1800/2 or 9 × 100 or 90 × 10 or 45 × 20 or equivalent (i.e. **one** step left to carry out)*
2. Organisation and Communication.	OC1	For OC1, candidates will be expected to: • represent 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
Accuracy of writing.	W1	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
3. Correct construction of bisector of angle ABC.	B1	Correct construction arcs (initial and secondary) and a line joining B to the point of intersection of the arcs must be seen or an alternative valid method.
Correct construction of perpendicular bisector of BC.	B1	Two correct pairs of intersecting construction arcs and a line joining both of these points of intersection must be seen.
Correct position of point P  	B1	CAO. Award B1 for the correct point of intersection and not labelled *P*, provided no other incorrect points are indicated. (May be awarded from previous B0B0.)

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Unit 1: Higher Tier	Mark	Comments
4. Sight of $7(x + 8)$ or equivalent **AND** Sight of $3(x + 1)$ or equivalent. $7(x + 8) + 3(x + 1) = 89$ or equivalent. $7x + 56 + 3x + 3 = 89$ $10x = 30$ $x = 3$	 B1 B1 B1 B1 B1	Check diagram for answers Brackets must be seen unless implied in later correct working. FT 'their expressions' provided of equivalent difficulty. Equating the sum of their two area expressions to 89. Correct expansion in an equation. FT only from $ax \pm b \pm cx \pm d = k$, provided working with area. FT from any equation of the form $fx = g$. Answer must be > –1 on FT. Accept an answer rounded, truncated or as an improper fraction (if not whole number) on FT. Mark final answer. If the first B0 or B1 awarded, then award an additional SC2 for $x = 3$ clearly identified as a final answer if no correct equation shown. Award full marks if $x = 3$ given and correct equation shown. If an incorrect equation shown and correct answer on FT given (with or without workings shown), award the final B0B1B1 marks.
4. Alternative method *Sight of $7(x + 8 + 3)$ or equivalent* ***AND*** *Sight of $3(7 – 1 – x)$ or equivalent.* *$7(x + 8 + 3) – 3(7 – 1 – x) = 89$ or equivalent.* *$7x + 77 – 18 + 3x = 89$* *$10x = 30$* *$x = 3$*	 *B1* *B1* *B1* *B1* *B1*	*Check diagram for answers.* *Brackets must be seen unless implied in later correct working.* *FT 'their expressions' provided of equivalent difficulty.* *Equating the difference of their two area expressions to 89.* *Correct expansion in an equation.* *FT only from $ax \pm b \pm cx \pm d = k$, provided working with area.* *FT from any equation of the form $fx = g$.* *Answer must be > –1 on FT.* *Accept an answer rounded, truncated or as an improper fraction (if not whole number) on FT.* *Mark final answer.* *If the first B0 or B1 awarded, then award an additional SC2 for $x = 3$ clearly identified as a final answer if no correct equation shown.* *Award full marks if $x = 3$ given and correct equation shown.* *If an incorrect equation shown and correct answer on FT given (with or without workings shown), award the final B0B1B1 marks.*

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Unit 1: Higher Tier	Mark	Comments
5. (LCM of 10 and 18 =) 90 or equivalent, e.g. 2×3×3×5 or 2 × 9 × 5. .	B2	B1 for any other common multiple identified e.g 180, 270 etc.
(HCF of 30 and 72 =) 6 or equivalent, e.g. 2×3.	B2	B1 for any other common factor identified i.e. 2, 3. Do not accept 1.
n = 15	B1	B2 B2 B0 for 90/6. FT only if at least one B2 gained. If at least one B2 awarded for correct products seen but incorrectly evaluated LCM or HCF, then B0 is awarded as the final mark. e.g. award B2 B2 B0 for 2 × 3 × 3 × 5 = 90 and 2 × 3 = 5, *n* = 90/5 = 18 award B1 B2 B0 for LCM = 180 and 2 × 3 = 5, *n* = 180/5 = 36. Accept an answer rounded, truncated or as an improper fraction if *n* is not an integer. If no marks awarded, award one of the following: • SC2 for a final answer of $\frac{2}{360}$ or $\frac{1}{180}$ equivalent (from reversing LCM and HCF) • SC2 for a final answer of $\frac{6}{90}$ or $\frac{1}{15}$ equivalent (answers reversed). • SC1 for sight of LCM = 2 **AND** HCF = 360 (from reversing LCM and HCF). An unsupported 15 is awarded B2B2B1.
6.(a) $\frac{5}{8}$ on 'Bus B' branch.	B1	Numerator and denominator must be integers. Allow any equivalent to $\frac{5}{8}$ e.g. 0·625. Do not allow 0·63.
$\frac{1}{2}$ or $\frac{4}{8}$ or 0·5 on **all** 'seat branches'.	B1	Allow any equivalent to $\frac{1}{2}$.
6.(b) $\frac{5}{8} \times \frac{1}{2}$ or equivalent	M1	FT 'their $\frac{5}{8}$' × 'their $\frac{1}{2}$' provided both values < 1.
= $\frac{5}{16}$ or $\frac{20}{64}$ or $\frac{25}{80}$ or equivalent. ISW	A1	Do not allow rounded or truncated answers if decimal given. Numerator and denominator must be integers.
7.(a) $5{\cdot}7 \times 10^{-3}$	B1	
7.(b) 4×10^{6}	B2	Mark final answer. Award B1 for one of the following: • sight of 4 000 000 • equivalent correct value but not in standard form e.g. $0{\cdot}4 \times 10^{7}$.

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Unit 1: Higher Tier	Mark	Comments
8. (Average speed =) $\frac{x + 36}{1 + 2} = 42$ or equivalent. OR (Total distance =) $x + 36 = 3 \times 42$ or equivalent. $(x =) 90$ ISW	M2 A1	Must be a complete and correct method for M2. Award M1 for sight of one of the following: • $\frac{x + 36}{1 + 2}$ • $\frac{x + 36}{3}$ • $\frac{x + 36}{180}$ (mins) • 3×42 • an appropriate 126. CAO. An unsupported answer of 90 is awarded M2A1. If no marks, award SC1 for a final answer of $x = 48$ (from working with 2 hours).
9. Sight of $2x + 3y = 13$ AND $8x - 3y = 22$ Method to eliminate one variable e.g. (equal coefficients **AND)** appropriate intention to add or subtract or use a method of substitution. First variable found $x = 3{\cdot}5$ or $y = 2$ or equivalent. Second variable found (Perimeter of triangle = 3·5 + 3·5 + 2 =) 9 (cm)	B1 M1 A1 A1 B1	Award B1 for sight of $(2x + 3y) + (8x - 3y) = 13 + 22$. May be implied in later working. FT 'their equations' if of equivalent difficulty. If equating coefficients, allow one error in one term (not the term with equal coefficients) e.g. the blue terms in the examples below. In the examples below, an appropriate intention to add or subtract is shown by sight of • $10x$ OR 35 or equivalent • $15y$ OR 30 • $30y$ OR 60 or equivalent. Sight of $10x = 35$ implies B1M1. CAO. Award A1 for $2x = 7$. FT substitution of their '1st variable' if M1 gained. Accept an answer rounded, truncated or as an improper fraction (if not whole number) on FT, provided > 0. FT 'their derived x and y', provided an algebraic method is used and both > 0. If the first B0 or B1 awarded, then award an additional SC1 for one of the following: • sight of $x = 3{\cdot}5$ **AND** $y = 2$ (if M0 awarded) • an unsupported answer of 9 (cm).

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Unit 1: Higher Tier	Mark	Comments
10. $\frac{(reflex)\ A\hat{O}B}{360} \times \pi \times 6^2$ (= $\frac{132\pi}{5}$ = $26 \cdot 4\pi$) or equivalent	M1	Area of major sector. Allow $\frac{x}{360} \times \pi \times 6^2$ (= $\frac{132\pi}{5}$).
(360 – x OR reflex A$\hat{O}$B =) $\frac{132\pi \times 360}{5 \times \pi \times 6^2}$ (= 264)	A1	
x (= 360 – 264) = 96(°)	A1	From A0, FT 360 – 'their 264', provided M1 awarded. An unsupported answer of 96(°) is awarded M1A1A1.
10. Alternative method: *Area of minor sector = $\pi \times 6^2 - \frac{132\pi}{5}$ (= $\frac{48\pi}{5} = 9 \cdot 6\pi$)*	*B1*	*Area of minor sector.*
$\frac{x}{360} \times \pi \times 6^2 = \frac{48\pi}{5}$ or equivalent	*M1*	*FT 'their derived $\frac{48\pi}{5}$'.*
x = 96(°)	*A1*	
11. Reference to: Enlargement Scale factor –3 Centre of enlargement (–2, 4)	 B1 B1 B1	Check diagram. If B3, penalise –1 for a multi-stage transformation e.g. extra 'rotation 180°'.
12. $x = k\sqrt{w}$ OR $24 = k\sqrt{36}$	M1	Allow $x \propto \sqrt{w}$ OR $x \propto k\sqrt{w}$. Allow $x \propto 4\sqrt{w}$.
k = 4 OR $x = 4\sqrt{w}$	A1	CAO
When w = 25, x = 20	A1	Allow $y \propto \frac{c}{x}$. Allow the use of k again.
$y \propto \frac{1}{x}$ OR $y = \frac{c}{x}$ OR $8 = \frac{c}{15}$	M1	Allow $y \propto \frac{120}{x}$. Allow M1 A1 for (y =) 8 x 15 ÷ 20 or 8 x ¾
c = 120 OR $y = \frac{120}{x}$	A1	FT 'their x', provided 2nd M1 awarded.
(When x = 20, y =) 6	A1	FT 'their k'. Accept an answer rounded, truncated or as an improper fraction (if not whole number). An unsupported answer of 6 is awarded no marks.
12. Alternative method: *$x = k\sqrt{w}$ OR $24 = k\sqrt{36}$*	*M1*	*Allow $x \propto \sqrt{w}$ OR $x \propto k\sqrt{w}$.*
k = 4 OR $x = 4\sqrt{w}$	*A1*	*Allow $x \propto 4\sqrt{w}$.*
$y \propto \frac{1}{x}$ OR $y = \frac{c}{x}$ OR $8 = \frac{c}{15}$	*M1*	*Allow $y \propto \frac{c}{x}$. Allow the use of k again.*
c = 120 OR $y = \frac{120}{x}$	*A1*	*Allow $y \propto \frac{120}{x}$.*
$y = \frac{120}{4\sqrt{w}}$ ($= \frac{30}{\sqrt{w}}$) or equivalent	*m1*	*If one previous M1 awarded:* *FT 'y = 120 / their x', with 'x' given in terms of 'w'* *OR* *FT substituting $x = 4\sqrt{w}$ in 'their y', with 'y' given in terms of 'x'.*
When w = 25, y = 6	*A1*	*Accept an answer rounded, truncated or as an improper fraction (if not whole number).*

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Unit 1: Higher Tier	Mark	Comments
13. $\widehat{DAF} = x$	B1	Check diagram. Must be unambiguous.
(Reason:) Alternate segment (theorem)	E1	Dependent on B1. Allow 'opposite segments (theorem)'.
$\widehat{BAD}$ (= 180 – 114) = 66(°) [OR $\widehat{BAD} = 180 - 3x = 180 - 114$]	B1	Check diagram. Must be unambiguously identified.
(Reason:) (Opposite angles in a) cyclic quadrilateral (add up to 180°)	E1	Dependent on clearly attempting [or stating] 180 – 114. (Sight of equation $66 + 2x + x = 180$ may imply previous B marks.)
x = 38(°)	B1	FT 'their 180 – 114'. An unsupported answer of 38 is awarded B3.
13. Alternative method 1: $A\hat{D}B = 2x$ *(Reason:) Alternate segment (theorem)*	*B1* *E1*	*Check diagram. Must be unambiguous.* *Dependent on B1. Allow 'opposite segments (theorem)'.*
$B\hat{A}D$ *(= 180 – 114) = 66(°)* *[OR $B\hat{A}D = 180 - 3x = 180 - 114$]*	*B1*	*Check diagram. Must be unambiguously identified.*
(Reason:) (Opposite angles in a) cyclic quadrilateral (add up to 180°)	*E1*	*Dependent on clearly attempting [or stating] 180 – 114.* *(Sight of equation $66 + 2x + x = 180$ may imply previous B marks.)*
x = 38(°)	*B1*	*FT 'their 180 – 114'.*
13. Alternative method 2: (using additional line AC) $A\hat{D}B = 2x$ *(Reason:) Alternate segment (theorem)*	*B1* *E1*	*Check diagram. Must be unambiguous.* *Dependent on B1.* Allow 'opposite segments (theorem)'.
$A\hat{C}D = x$ *and* $A\hat{C}B = 2x$ *(Reason:) Angles in the same segment (are equal) or Angles on the same arc (are equal)*	*B1* *E1*	*Check diagram. Must be unambiguous.* *Dependent on B1* *($A\hat{C}D + A\hat{C}B = B\hat{C}D$)* *(Sight of equation $2x + x = 114$ may imply previous B marks.)*
x = 38(°)	*B1*	
14. $(2x - 5)(x - 6)$	B2	B1 for $(2x \ldots 5)(x \ldots 6)$ B1 for two brackets which multiply to give $2x^2 - 17x + k$ or $2x^2 + mx + 30$ SC1 for sight of the two correct factors, but not as a product.
15. (a) (i) $2\sqrt{5}$	B1	
15. (a) (ii) $6\sqrt{2}$	B1	
15. (b) q^4	B1	

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Unit 1: Higher Tier	Mark	Comments
16. (a) (Numerator) $4y\ (y + 2x)$	B1	
(Denominator) $(y + 2x)(y - 2x)$	B2	B1 for $(y \ldots 2x)(y \ldots 2x)$
$\frac{4y}{y-2x}$ or equivalent.	B1	Mark final answer. FT provided no more than one previous error and provided simplification required.
16. (b)		FT until 2nd error for equivalent level of difficulty.
Sight of $hf^2 - m = 9f^2$	B1	Squaring Allow $3^2 f^2$ or $(3f)^2$ or $(3f)(3f)$ for $9f^2$.
$hf^2 - 9f^2 = m$ or equivalent	B1	Isolating terms in f^2. FT a formula with three or more terms AND with at least two terms in f^2.
$f^2(h - 9) = m$ or equivalent	B1	Factorising fully.
$f^2 = \frac{m}{h-9}$ OR $f^2 = \frac{-m}{9-h}$	B1	Isolating f^2.
$f = \pm\sqrt{\frac{m}{h-9}}$ OR $f = \pm\sqrt{\frac{-m}{9-h}}$	B1	Mark final answer. Allow omission of $\pm$.
17. (P[same colour] =) $\frac{7}{11} \times \frac{6}{10} + \frac{4}{11} \times \frac{3}{10}$ or equivalent OR (P[different colours] =) $\frac{7}{11} \times \frac{4}{10} + \frac{4}{11} \times \frac{7}{10}$ or equivalent	M2	M1 for sight of one product correct.
$= \frac{54}{110}$ $(= \frac{27}{55})$ or equivalent OR $= \frac{56}{110}$ $(= \frac{28}{55})$ or equivalent	A1	Award for the answer to either probability (total). Mark final answer. Do not ignore incorrect cancelling. If both probabilities are evaluated, accept 110 written as 11 × 10.
'No' or 'Gareth is incorrect' with explanation e.g. P(different colours) = $1 - \frac{54}{110} = \frac{56}{110}$ or e.g. each probability would need to be $\frac{55}{110}$ $(= \frac{1}{2})$ for them to be equal e.g. P(same colour) = 54/110 AND P(different colours) = 56/110	E1	If M2 A0 (or M1 A0) awarded where only <u>one</u> of P[same colour] or P[different colours] is calculated, FT E1 for 'No' with a valid explanation given based on P[same colour] + P[different colours] = 1. If M2 A1 awarded where <u>both</u> P[same colour] and P[different colours] are calculated, the second probability must also be correct in order to award E1. If M2 A0 (or M1 A0) awarded where <u>both</u> P[same colour] and P[different colours] are incorrectly calculated, do not FT E1. If M0A0, award SC1 (and a possible E1) for an answer of $\frac{65}{121}$ or $\frac{56}{121}$ (method 'with replacement').

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Unit 1: Higher Tier	Mark	Comments
18. (a)(i) Horizontal translation to the right with x-intercepts at 2 and 6 (clearly labelled).	B2	B1 for one of the following: • original shape with horizontal translation to right - with missing or incorrect x-intercepts marked OR • concave curve with x-intercepts at 2 and 6
18. (a)(ii) (4, 5)	B1	FT only from a translation (of 6 units) to the left i.e. (-8,5), provided curve was drawn in part (a)(i).
18. (b) Reflection in x-axis Intercepts y-axis at (0, – 3)	B1 B1	Mark clear intention. Any clear indication. Depends on first B1.

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GCSE MARKING SCHEME

SUMMER 2024

GCSE
MATHEMATICS
UNIT 2 – HIGHER TIER
3300U60-1

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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.

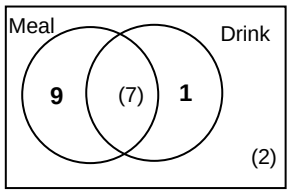
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WJEC GCSE MATHEMATICS

SUMMER 2024 MARKING SCHEME

Unit 2: Higher Tier	Mark	Comments
1.(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.
1.(b) 8	B1	Answer line takes precedence. Allow embedded answer in working space provided not contradicted on answer line.
1.(c) 7	B1	Answer line takes precedence. Allow embedded answer in working space provided not contradicted on answer line.
2.(a) 4	B1	Answer in table takes precedence.
2.(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)'.
2.(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.

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Unit 2: Higher Tier	Mark	Comments
3.(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.
3.(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.

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Unit 2: Higher Tier	Mark	Comments
4. (Volume of tank =) $70 \times 40 \times 30$	M1	Answer line takes precedence. 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 =) $74575(\cdot\ldots cm^3)$	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 $74575(\cdot\ldots cm^3)$ is awarded M1A1M1A1B1B0. Unsupported answers in the above list is awarded M1A1M1A1B1B1.
4. <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 =) $2485(\cdot 8\ldots) \times 30$	*M1*	*FT 'their derived base area', provided at least M1 previously awarded.*
$74575(\cdot\ldots cm^3)$	*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.*

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Unit 2: Higher Tier	Mark	Comments
Organisation and Communication.	OC1	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
Accuracy of writing	W1	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.
5.(a) −3	B1	
5.(b) (0, 7)	B1	

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Unit 2: Higher Tier	Mark	Comments
6. $13{\cdot}8^2 = BD^2 + 7{\cdot}3^2$ 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….

6. 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*	
6. 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.*

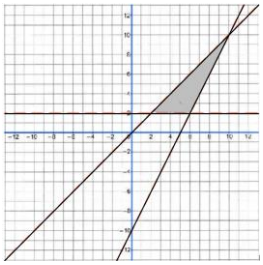
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Unit 2: Higher Tier	Mark	Comments
7.(a) $\frac{x}{13.3} = \frac{5.2}{3.8}$ or $\frac{x}{5.2} = \frac{13.3}{3.8}$ or equivalent x = 18·2	M1 A1	M1 for correct use of scale factor 3·5 or equivalent e.g. $x = 5{\cdot}2 \times \frac{7}{2}$ An unsupported answer of 18·2 is awarded M1A1.
7.(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. 15/6 = 10/4 (= 2·5) OR 6/4 = 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.
8. $(x + 8)(x - 5)$ $(x =) -8$ AND $(x =) 5$	B2 B1	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 $x^2 + mx - 40$. **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)

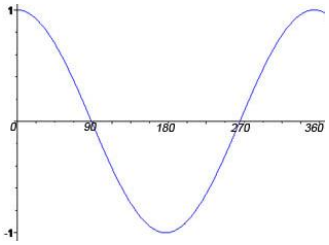
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Unit 2: Higher Tier	Mark	Comments
9. $\frac{a+b}{2} = b - a$ $a + b = 2(b - a)$ $a + b = 2b - 2a$ or $a + 2a = 2b - b$ $(= 3a = b)$	B1 B1 B1	Award B0 for $a + b \div 2 = b - a$ unless brackets are implied in later correct workings. May be implied by correct further work (e.g. $a + b = 2b - 2a$). 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 $9 - 3 = 6$.
9. 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.*
10.(a) (Berwyn = £) $0{\cdot}6x$ or equivalent	B1	CAO. Must be in terms of x e.g. award B0 for (£)0·6.
10.(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 = (£)$0{\cdot}7x$.

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Unit 2: Higher Tier	Mark	Comments
11. 2^{398}	B1	Mark final answer. Allow (n=) 398.
12.(a) $\sqrt{(113^2 - 72^2 - 84^2)}$	M3	May be seen in stages. *(If the answer is completed in stages, then any arithmetic errors in intermediate answers can be ignored, allowing for a FT for any remaining M marks).* M2 for $113^2 - 72^2 - 84^2$ (= 529). M1 for the correct method of finding a length in a triangle, which may be embedded in incorrect working, e.g.: • $84^2 + 72^2$ (= 12240) ($\sqrt{12240}$ = 110·63…) • $113^2 - 84^2$ (=5713) ($\sqrt{5713}$ = 75·58…) • $113^2 - 72^2$ (= 7585) ($\sqrt{7585}$ = 87·09…) • $113^2 + 84^2 + 72^2$ • $113^2 + 84^2 - 72^2$ • $113^2 - 84^2 + 72^2$
= 23 (cm)	A1	CAO Allow answers in the range 22·6(cm) to 23·2(cm) provided OA^2 is in the range 510·76 to 538·24.
12(a) Alternative method *A correct multi-step method, involving a trigonometric method leading to a correct answer.*	*M3*	*M2 for a correct multi-step method leading to OA^2 (= 529).* *M1 for a method leading to:* • *(AC =) 110·63…(cm) OR (AC^2 =) 12240* • *(OB =) 75·58…(cm) OR (OB^2 =) 5713* • *(OD =) 87·09…(cm) OR (OD^2 =) 7585*
= 23 (cm)	*A1*	*CAO* *Allow answers in the range 22·6(cm) to 23·2(cm) provided OA^2 is in the range 510·76 to 538·24.*
12.(b). 84×72×23÷3	M1	May be seen stages. Or equivalent. FT 'their derived height' from 12(a).
= 46 368(cm^3)	A1	
13. Correct region identified. 	B3	Accept indication by 'shading out'. B2 for two lines drawn correctly OR three lines drawn correctly with no region or an incorrect region identified. B1 for one line drawn correctly. If there are more than three lines drawn, only award B2 or B1 if the correct lines are clearly identified. If $y = 2$ shown and any other vertical or horizontal line shown e.g. $x = \pm 2$ or $y = -2$, unless $y = 2$ is selected for the region or clearly labelled, do not consider this as a correct line. *Minimum length of a line must be 2 cm.* *For a line to be considered correct, it must be so for the entirety of its drawn length.*
14. 1/2×24·1×17·9×sin37 = 129·8(08… cm^2) OR 129·81(cm^2) OR 130 (cm^2)	M1 A1	Accept a complete alternative correct method. CAO. Not from premature approximation. | | Radians | Gradians | | Area | -138·807… | 118·421…. |

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Unit 2: Higher Tier	Mark	Comments
15. $\frac{7\cdot15}{73\cdot85-65\cdot75}$ or $\frac{7\cdot15}{8\cdot1}$	M2	If many attempts are offered without a method/answer being identified then mark final attempt. Award M2 for sight of 143/162 if clearly identified as 'their final attempt'. Accept 7·14999… or 65·74999… (or using recurring dot notation). Do not accept truncated values of 7·149 or 7·1499 or 65·749 or 65·7499. Award M1 for correct use of values 7·1 < e ≤ 7·2, 73·8 ≤ f < 73·9 and 65·7 < g ≤ 65·8 OR award M1 for correct use of 2 of the 3 correct bounds, 7·15, 73·85 and 65·75.
= 0·8827	A1	CAO. Must be correct to 4 decimal places. Only award A1 if M2 gained. If no marks gained award SC1 for an unsupported answer of 0·8827(16…).
16.(a) Cosine curve with appropriate orientation and position AND passing through (0°,1), (90°,0) and (270°,0) and approximately (180°,-1) and (360°,1) AND 90(°), 180(°), 270(°), 360(°) indicated on the x-axis AND -1 and 1 indicated on the y-axis.  	B2	Ignore curve shown for values x< 0° or x> 360°. Accept 180° as mid-way between 0° and 360° if unlabelled. Accept 360° as unlabelled provided the sketch does not exceed 360°. B1 for: • General cosine curve with appropriate orientation and appropriate position (ignore missing or incorrect labelling) **OR** • A continuous graph passing through (0°,1), (90°,0) and (270°,0) and approximately (180°,-1) and (360°,1) AND 90(°),-270(°), indicated on the x-axis AND -1 and 1 indicated on the y-axis. Accept 180° as mid-way between 0° and 360° if unlabelled. Accept 360° as unlabelled provided the sketch does not exceed 360°.
16.(b) 60(°) AND 300(°)	B2	Ignore any angle outside of the range 0° < x < 360°. Note B2 for 60(°) AND 300(°) and no other angle within the range 0° < x < 360°. Allow embedded answers. If not B2, award B1 for either of the following: • 60(°) **AND** 300(°) and one incorrect angle within the range 0° < x < 360° • 60(°) **OR** 300(°) and up to one incorrect angle within the range 0° < x < 360° If B2 or B1 awarded, penalise -1 for each further incorrect answer.
17. $3\times\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}$ or equivalent	M2	M1 for sight of $\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\left(=\frac{1}{216}\right)$(one correct product).
$=\frac{3}{216}\left(=\frac{1}{72}\right)$ ISW	A1	Accept decimal answer of 0·0138(8…) OR 0·0139.

	Radians	Gradians
60°	π/3 or 1·047…	66·666…
300°	358·952…	293·333…

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Unit 2: Higher Tier	Mark	Comments
18. Area scale factor: $\left(\sqrt[3]{3821/569}\right)^2$ (= 3·559…) OR $\left(\sqrt[3]{569/3821}\right)^2$ (= 0·280…) or equivalent.	M2	May be seen in parts. Allow $\left(\sqrt[3]{3821}\right)^2 : \left(\sqrt[3]{569}\right)^2$, or equivalent (written as a ratio). Award M1 for: • $\sqrt[3]{3821/569}$ (= 1·886…) • $\sqrt[3]{569/3821}$ (= 0·530…) • (3821/569)^2 (= 45·095…) • (569/3821)^2 (= 0·022...) • $\left(\sqrt[3]{3821}\right)^2$ (= 244·409…) AND $\left(\sqrt[3]{569}\right)^2$ (= 68·665…)
Cross-sectional area of larger solid = $29 \times \left(\sqrt[3]{3821/569}\right)^2$ OR $29 \div \left(\sqrt[3]{569/3821}\right)^2$ or equivalent.	m1	Must be from M2.
103·2(…cm^2)	A1	CAO. Accept answers in the range 103·2(cm^2) to 103·3(cm^2). Allow 103 provided not from premature approximation.
18. Alternative method *Height of larger solid:* $569/29 \times \sqrt[3]{3821/569}$ *OR* $569/29 \div \sqrt[3]{569/3821}$ *(= 37·017…)*	*M2*	*May be seen in parts.* *Award M1 for a linear scale factor:* $\sqrt[3]{3821/569}$ *(= 1·886…) OR* $\sqrt[3]{569/3821}$ *(= 0·530…) or equivalent.*
Cross-sectional area of larger solid = *3821÷ 37·017…*	*m1*	*Award using 'their 37·017…'* Must be from M2.
103·2(…cm^2)	*A1*	*CAO.* *Accept answers in the range 103·2(cm^2) to 103·3(cm^2).* *Allow 103 provided not from premature approximation.*
19. $6x^2 + 19x + 1 = 0$	B2	'= 0' required, but may be implied by an attempt to use the quadratic formula or if $a = 6, b = 19, c = 1$ used in the quadratic formula. Award B1 for sight of $7x^2 + 21x(+1)$ AND $x^2 + 2x$
$x = \frac{-(19) \pm \sqrt{(19)^2 - 4 \times 6 \times 1}}{2 \times 6}$	M1	**This substitution into the formula must be seen for M1, otherwise award M0A0A0.** FT 'their derived quadratic equation equated to zero' provided of equivalent difficulty (a, b and c must be non-zero). No FT from $7x^2 + 21x + 1 = 0$. Allow one slip in substitution **for M1 only**, but must be correct formula. This can be awarded as a single attempt which may be seen anywhere in the solution for solving their quadratic equation equated to zero.
$x = \frac{-19 \pm \sqrt{337}}{12}$	A1	Can be implied from at least one correct value of x evaluated (not necessarily rounded to 2dp), provided M1 awarded.
x = –0·05 with x = –3·11 (answers to 2dp)	A1	CAO for their quadratic equation.

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Unit 2: Higher Tier		Mark	Comments
20.	Complete strategy to calculate x, e.g. first an attempt to use the cosine rule to calculate BD and then an attempt to use the cosine rule by rearrangement to calculate x **using BD**.	S1	Stating the formulae is insufficient. Both stages must be seen. If many attempts are offered for both stages and they are not clearly identified as being used to evaluate BD and then x, then mark final attempt.
	$(BD^2 =)\ 13^2 + 17^2 - 2\times13\times17\times\cos43$ $(BD^2 =)\ 134{\cdot}7(\ldots)$ OR $(BD =)\ 11{\cdot}6(\ldots\text{cm})$	M1 A1	Allow an alternative complete correct method for M1. Radians: BD^2 212·639…, BD 14·582… Gradians: BD^2 113·049…., BD 10·632….
	$\cos x = \dfrac{11^2 + 19^2 - 11{\cdot}6(\ldots)^2}{2\times11\times19}$	M2	FT 'their stated or derived BD', provided $8 <$ 'their BD' < 30 M1 for $11{\cdot}6(\ldots)^2 = 11^2 + 19^2 - 2\times11\times19\times\cos x$ Allow an alternative complete correct method for M2.
	$(x =)\ 33{\cdot}8(\ldots°)$	A1	Accept an answer which rounds to 33·8(°) Allow an answer of 34(°) from correct working. An answer of 36(·039…) from BD=12 is: S1M1A0M2A1. Note: The first A1 is only withheld if 12 (rounded from 11.6) is used in the subsequent cosine rule to find the angle *x* AND only if the work is worthy of any further marks.

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