

GCSE MARKING SCHEME

SUMMER 2022

GCSE
MATHEMATICS
UNIT 1 – INTERMEDIATE TIER
3300U30-1

INTRODUCTION

This marking scheme was used by WJEC for the 2022 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

WJEC GCSE MATHEMATICS

SUMMER 2022 MARKING SCHEME

Unit 1: Intermediate Tier	Mark	Comments
1. (a) 72	B2	B1 for an appropriate sight of 9 or 8.
1. (b) —31	B1	
1. (c) 42 ISW	B1	Allow 42·0
2. Showing 30% (31%), and 32% OR 30/100, 31/100 and 32/100 OR (0·3), 0·31 and 0·32 OR three correct calculations for a common amount. 0·3 31%, 8/25 in order	B2 B1	B2 for all correct %, OR all correct fractions with a common denominator, OR all correct decimals, OR correct work using a common amount, OR a valid combination that allows full comparison. B1 for one correct conversion or two correct calculations for a common amount. Allow any unambiguous indication (e.g. 'converted'
0 0 0170, 0/20 m order		values.) <u>Strict FT</u> of 'their work' if at least B1 gained. Correct answer, with <u>no</u> other marks awarded, gains final B1 only.
3. 360 - 90 - 220 or equivalent	M1	Answer line takes precedence. Note: 360 – 310 or 270 – 220 or 140 – 90. Award M1 for complete method or intention of complete method provided not contradicted e.g. brackets missing 360 - 90 + 220.
= 50(°)	A1	May be seen in later working. May be seen in stages.
(x =) (180 - 50) ÷ 2 or equivalent	M1	FT (180 – 'their 50') ÷ 2
= 65(°)	A1	
3. <u>Alternative method</u>		Answer line takes precedence.
(Exterior angle = sum of the two opposite interior angles =) $220 - 90(=) 130(^{\circ})$	B1	
(x =) 130 ÷ 2 or equivalent = 65(°)	M2 A1	FT (their '220 – 90') ÷ 2

4. Imran = 25 (years old) Glyn = 16 (years old) Sheila = 8 (years old)	В3	Values in the answer space take precedence. If answer spaces are left blank allow unambiguous indication of their answers. Note: Check for the required conditions being met and not the individual numbers. Required conditions (or equivalent) are: I + G + S = 49 I = G + 9 G = 2 × S A condition must be met using non-negative ages, otherwise B0. B3 all three conditions correct. B2 for two conditions correct. B1 for one condition correct. If answer spaces are left blank, but 25,16 and 8 clearly indicated, but unlabelled and in the correct order, award B3 in any other order, award B2. Award B2 for 25, 16 and 8 in any order on the answer spaces.
5. (a) Any n , as a whole number, which results in $7n-9$ being a multiple of 4	B2	 Answer space takes precedence and must not be from incorrect working. Do not ignore crossed-out work for this question. Award B1 for any one of: any 2 correctly evaluated terms in the sequence 7n - 9 (i.e. not leading to, or not recognised as leading to, a multiple of 4 for their choice of n) or setting up an equation 7n - 9 = 4 × k (where k ≥ 1 and a whole number) and attempt to solve a correct value of n substituted in 7n - 9, but contradiction or no answer given on answer line (e.g. 7×3 - 9 = 12 and 12 written on answer line or answer line left blank). n 1 2 3 4 5 6 7 8 9 10 11 7n - 9 -2 5 12 19 26 33 40 47 54 61 68 Note: Award B0 for a correct value of n from incorrect working e.g. if 7 × 4 - 9 = 19, then n = 19 on the answer line.

5. (b) Any n , as a whole number, which results in $3n-5$ being a prime number	B2	Answer space takes precedence and must not be from incorrect working. Do not ignore crossed-out work for this question. Award B1 for any one of: • any 2 correctly evaluated terms in the sequence $3n-5$ (i.e. not leading to, or not recognised as leading to, a prime number for their choice of n) or • setting up an equation $3n-5=a$ prime number and attempt to solve • a correct value of n substituted in $3n-5$, but contradiction or no answer given on answer line (e.g. $3\times4-5=7$ and 7 written on answer line or answer line left blank) • a correct value of n substituted in $3n-5$, but n contradicted for their workings given on answer line (but n still leads to a prime number) (e.g. $3\times4-5=7$ and 12 written on answer line). Note: Award B0 for a correct value of n from incorrect working e.g. if $3\times4-5=13$, then $n=13$ on the answer line.
6. (a) (P(green or yellow) =) 0·7 or equivalent (P(yellow) =) 0·35 or equivalent ISW	B1 B1	FT 'their 0.7 ' ÷ 2, provided not 0.3 and less than 1. If no marks awarded, award SC1 for $P(red) + P(green) + P(yellow) = 1$.
6. (b) Any valid explanation e.g. "as there are 10 balls, the only possible probabilities are 0·1, 0·2, 0·3 etc" "(you can't have) 2·5 balls" "a quarter of 10 is not a whole number" "0·25 of 10 = 2·5, you can't have half a ball" "10 is not divisible by 4"	E1	Accept "you can't have half a ball". Allow sight of 2.5 for E1. Do not accept incomplete explanations e.g. "we don't know how many blue (or white) balls there are".

7. (a) $4y = 18$ $y = 4\frac{1}{2}$ or $18\frac{1}{4}$ or $9\frac{1}{2}$ or 4.5	B1 B1	Mark final answer. FT from $4y = k$. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. Award B1B1 for a final answer of 4r2 only if a correct answer is seen. Award B1B0 for unsupported 4r2. Allow B1B1 for a correct embedded answer BUT only B1B0 if contradicted by $y \neq 4\frac{1}{2}$.
7. (b) $8x + 3x = 17 + 38$ OR $-17 - 38 = -8x - 3x$ $11x = 55$ OR $-55 = -11x$ $x = 5$	B1 B1 B1	FT until 2^{nd} error. Mark final answer. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise, accept a fraction. Allow B1B1B1 for a correct embedded answer BUT only B1B1B0 if contradicted by $x \neq 5$
8. (Area of rectangle) $48 = 8 \times x$ (width of rectangle, $x = 48/8 =$) 6 (m) (Area of trapezium =) $(5 + 9) \times (6 \times 2)$ or equivalent	M1 A1 M1	Lengths may be shown on the diagrams. Allow an embedded 6 e.g. $8 \times 6 = 48$ for M1A1. Sight of 12(m) implies the previous M1A1. FT 'their stated $x' \times 2$. Allow M1 for correct intent seen. e.g. $5 + 9 \times 12 \div 2$
= 84 (m²) 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

9. 7, 7, 10, 12 (in any order)	В3	Numbers shown in number boxes take precedence. The four conditions: • All numbers between 1 and 15 inclusive. • Unique mode = 7. • Median = 8-5. • Total = 36. B2 for three conditions met. B1 for two conditions met. FOUR numbers must be shown, otherwise B0. Award B1 only for 7, 7,10,10 OR 7, 7,11,11 (not a unique mode).
10. (BC =) 56 (km) \div (3 + 4) \times 4 or equivalent	M1	M1 awarded for complete method.
32 (km)	A1	
(BC =) 32 (km) ÷ 8 × 5 or equivalent 20 (miles)	M1 A1	FT 'their derived 32' \div 8 \times 5. If a candidate works with AB instead of BC, then treat as a misread -1 (from A mark). Example 1 56 (km) \div (3 + 4) \times 3 = 24 (km) M1A1 (-1) 24 (km) \div 8 \times 5 = 15 (miles) M1 A1 (Total = 3 marks) Example 2 e.g. 56 (km) \div (3 + 4) \times 3 = 16 (km) M1A0 16 (km) \div 8 \times 5 = 10 (miles) M1 A1 (-1) (Total = 2 marks)
	M1 A1	M1 awarded for complete method
(BC =) 35 (miles) ÷ (3 + 4) × 4 or equivalent 20 (miles)	M1 A1	FT 'their derived 35' \div (3 + 4) \times 4 If a candidate works with AB instead of BC, then treat as a misread -1 (from second A mark). 56 (km) \div 8 \times 5 = 35 (miles) M1 A1 35 (miles) \div (3 + 4) \times 3 = 15 (miles) M1A1(-1) (Total = 3 marks)

11.(a) -4 -2	B2	B1 for each
11. (b) At least 5 correct plots and no incorrect plot. A smooth <u>curve</u> drawn through their plots.	P1 C1	FT 'their (-1,-4)' and 'their (1,-2)' Allow ± '½ a small square'. FT 'their 7 plots' OR a curve through the 5 given points AND (-1,-4) and (1,-2). Allow the intention to pass through their plots (within 1 small square, either horizontally <u>or</u> vertically of the point).
11. (c) —2·6 AND 1·6	B1	Strict FT 'their curve' only if exactly two points of intersection with the <i>x</i> -axis. Answers must be written to one decimal place. Allow ± 'up to but not including 1 small square'.

12. (0 pets angle =) 40(°) ± 2(°)	B1	Answers may be seen on diagrams.
(Year 5: 0 pets =) $\frac{40(^{\circ}) \pm 2(^{\circ})}{360} \times 36$	M1	Or equivalent. FT 'their 40'.
(Year 5: 0 pets =) 4	A1	Answer must be whole number and from correct working (e.g. not from 360 ÷ 90). An answer of 4 (may be seen as 4/36) implies B1M1A1, provided not from incorrect working.
(Year 5: 1 pet =) 9	B1	May be seen as 9/36.
(Probability no more than 1 pet =) 27 or equivalent ISW 61	B2	FT 'their derived 4' + 'their derived 9' + 6 + 8 61 (no more than 1 pet) B1 for a numerator of 27 in a fraction < 1. FT 'their derived 4' + 'their derived 9' + 6 + 8 accurately evaluated as a numerator in a fraction < 1. B1 for a denominator of 61 in a fraction < 1. Penalise incorrect notation -1. e.g. '27 in 61'. If no marks awarded, award SC1 for sight of a correct 61. Special cases: If only 1 pet considered from Year 5 AND Year 6, an answer of 17 would gain B0 or B1 M0A0B1B2 61 FT 'their derived 9' + 8 for B0 or B1 M0A0B0B2 61 Last B1 for a numerator of 17 in a fraction < 1. FT 'their derived 9' + 8 accurately evaluated as a numerator in a fraction < 1. Last B1 for a denominator of 61 in a fraction < 1. Penalise incorrect notation -1. e.g. '17 in 61'. If only 0 pets considered from Year 5 AND Year 6, an answer of 10 would gain B1M1A1B0B2 61 FT 'their derived 4' + 6 for B1M1A0B0B2 61 Last B1 for a numerator of 10 in a fraction < 1. FT 'their derived 4' + 6 accurately evaluated as a
		numerator in a fraction < 1. Last B1 for a denominator of 61 in a fraction < 1. Penalise incorrect notation −1. e.g. '10 in 61'.

12. Alternative method 1		Answers may be seen on diagrams
(0 + 1 pet angle =) 130(°) ± 2(°)	B1	
(Year 5: 0 + 1 pet =) $\frac{130(^\circ) \pm 2(^\circ)}{360} \times 36$	М1	Or equivalent FT 'their 130'
(Year 5: 0 + 1 pet =) 13	A2	May be seen as 13/36 Award A1 for an answer not rounded.
(Probability no more than 1 pet =) 27 or equivalent ISW 61	B2	FT ('their derived 13' + 6 + 8). 61 B1 for a numerator of 27 in a fraction < 1. FT 'their derived 13' + 6 + 8 accurately evaluated as a numerator in a fraction < 1. B1 for a denominator of 61 in a fraction < 1. Penalise incorrect notation −1. e.g. '27 in 61'.
		If no marks awarded for the whole question, award SC1 for sight of a correct 61.

12. Alternative method 2		Answers may be seen on diagrams
	B1	Thoward may be deen on diagrams
(Each child is represented by $\frac{360(^\circ)}{36}$ =) 10(°)	וט	
36	D4	
(Year 5: 0 pets angle = $40(^\circ) \pm 2(^\circ)$	B1	
(Year 5: 0 pets = $40(^{\circ}) \pm 2(^{\circ}) = $) 4	B1	FT 'their 40'
10(°)		Answer must be whole number and from correct
10()		working (e.g. not from 360 ÷ 90)
		An answer of 4 (may be seen as 4/36) implies
		B1B1B1, provided not from incorrect working.
		provided not nom moorrest working.
	B1	May be seen as 0/26
(Year 5: 1 pet =) 9	DТ	May be seen as 9/36
(Probability no more than 1 pet =)		
27 or equivalent ISW	B2	FT ('their derived 4' + 'their derived 9' + 6 + 8)
61		61
		B1 for a numerator of 27 in a fraction < 1.
		FT 'their derived 4' + 'their derived 9' + 6 + 8
		accurately evaluated as a numerator in a fraction < 1
		B1 for a denominator of 61 in a fraction < 1.
		Penalise incorrect notation -1. e.g. '27 in 61'.
		T enailse incorrect notation T. e.g. 27 in or .
		If no marks awarded award CC1 for sight of a correct
		If no marks awarded, award SC1 for sight of a correct
		61.
		Special cases:
		If only 1 pet considered from Year 5 AND Year 6, an
		answer of <u>17</u> would gain B0 or B1 B0B0B1B2
		61
		FT 'their derived 9' + 8 for B0 or B1 B0B0B0B2
		61
		Last B1 for a numerator of 17 in a fraction < 1.
		FT 'their derived 9' + 8 accurately evaluated as a
		numerator in a fraction < 1.
		Last B1 for a denominator of 61 in a fraction < 1.
		Penalise incorrect notation −1. e.g. '17 in 61'.
		If and One to consider addition Vision F. AND Vis.
		If only 0 pets considered from Year 5 AND Year 6,
		an answer of <u>10</u> would gain B1B1B1B0B2
		61
		FT 'their derived 4' + 6 for B1B1B0B0B2
		61
		Last B1 for a numerator of 10 in a fraction < 1.
		FT 'their derived 4' + 6 accurately evaluated as a
		numerator in a fraction < 1.
		Last B1 for a denominator of 61 in a fraction < 1.
		Penalise incorrect notation -1. e.g. '10 in 61'.
		T GHAING INCOMECT NOTATION - 1. C.Y. TO IN OT.

13. $-6n + 21$ or equivalent	B2	B1 for sight of -6n.
13. $-0n + 21$ of equivalent	02	If no marks, award SC1 for $6n + 21$.
		in no marks, award 601 for on + 21.
14. (a) 0.4 shown on 'A does not occur' branch	B1	
Use of 0.6 × = 0.48	M1	
P(B occurs) = 0.8	A1	Allow M1A1 if 0.8 seen on one of the 'B occurs'
(= 5553.5)		branches.
Second set of branches 0.8, 0.2, 0.8, 0.2	A1	FT 'their 0·8' only if M1 awarded.
		(0·48, 0·52, 0·48, 0·52 is M0A0A0)
14. (b) 0.4×0.2	M1	FT 'their 0·4' × 'their 0·2' provided both between 0
= 0.08 ISW	A1	and 1.
= 0.00 1344		
15. (a) (<i>CE</i> =) 8 × <u>15</u> or 8 ÷ <u>10</u>	M1	Or equivalent
10 0 15		M1 for correct <u>use</u> of linear ratio.
10 10		Without defined add of miled ratio.
= 12 (cm)	A1	
15.(b)		
$(AB =) 10.5 \times \underline{10}$ or $10.5 \div \underline{15}$ or equivalent	M1	Or equivalent
15 10		M1 for correct <u>use</u> of linear ratio.
- / \		FT (the six seeds for steel) for my (a) are sided as at 4
= 7 (cm)	A1	FT 'their scale factor' from (a) provided not 1.
16.		
Method to eliminate one variable	M1	Allow one error in one term (not the term with equal
e.g. 'equal coefficients AND <u>appropriate intention to</u>	1411	coefficients).
add or subtract' or use a method of substitution		Coomorno).
First variable found $x = 4$ or $y = 7$.	A1	CAO.
		Award A0 for an answer that leads to a whole
		number, but not expressed as a whole number
		(e.g. $y = 161/23$ or $x = 92/23$)
Substitute to find the 2 nd variable.	m1	
Second variable found.	A1	FT substitution of their '1st variable' if M1 gained.
		If FT leads to a whole number answer, it must be
		shown as a whole number. Otherwise accept a
		fraction.
		If no marks gained allow SC1 for both answers of
		If no marks gained, allow SC1 for <u>both</u> answers of
		x = 4 AND $y = 7$.
17. (a) $7.2 \times 10^6 \text{ cm}^3$	B1	
7.2 × 10 011	5'	
17. (b) 6	B1	
18. 0.2	B2	If B2 not awarded, award B1 for one of the following:
- -		• sight of 150 000 or
		• sight of 3 × 10 ⁴ or
		• 2×10^{-1} or
		• $\frac{1}{5}$ or $\frac{3}{15}$ (or equivalent fraction)