GCSE MARKING SCHEME

AUTUMN 2023

GCSE
MATHEMATICS
UNIT 1 – INTERMEDIATE TIER
3300U30-1

INTRODUCTION

This marking scheme was used by WJEC for the 2023 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.

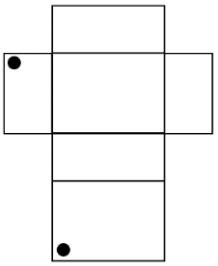
It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

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

WJEC GCSE MATHEMATICS

AUTUMN 2023 MARKING SCHEME

GCSE Mathematics **Unit 1: Intermediate Tier**	Mark	Comments
1.(a) 6 and −4	B2	Award B1 for one of the following: • 6 as the first missing number • 'their 6' – 10 evaluated correctly as the second missing number provided 'their 6' < 10.
1.(b) –2	B2	Mark final answer. Award B2 for unsupported –2 provided not from incorrect working. Award B1 for one of the following: • sight of –20 (not –20x) • sight of (+)18 (not 18y and not –18) • –2 (with additional letters) • a final answer of 38 or –38 (18 or –20 implied).
1.(c) $2y - 3m$	B2	Mark final answer. Must be an expression for B2. Award B1 for one of the following: • sight of (+)$2y$ • sight of $-3m$ (do not allow …– – $3m$) • $2y + -3m$.
2. Showing 41% and 35% and (45%) OR $\frac{41}{100}$ and $\frac{35}{100}$ and $\frac{45}{100}$ OR (0·41) and 0·35 and 0·45 OR three correct calculations for a common amount.	B2	Award B2 for one of the following: • all correct % ($\frac{41}{100}$ and $\frac{35}{100}$ must be shown as 41% or 35%) • all correct fractions **with a common denominator** (could include decimals as numerators and denominators) • all correct decimals • correct work using a common amount • a valid combination that allows full comparison (e.g. $\frac{7}{20}$ = 0·35 and 0·41 = 41%). Award B1 for one of the following: • one correct **conversion** (percentage or decimal) • two correct fractions with a common denominator • two correct calculations for a common amount.
45% 0·41 $\frac{7}{20}$ in order	B1	Allow any unambiguous indication (e.g. 'converted' values.) If first B1 awarded then allow a **strict FT** of 'their work' for a possible final B1. If first B0 awarded, then award the final B1 for a correct final answer, only if: • no incorrect conversions seen (e.g just 45/100 given), OR • an unsupported correct final answer seen.

3.(a) 	B2	Accept any indication. Award B1 for one of the following: • one correct dot with no more than one incorrect dot shown • two correct dots with one incorrect dot shown.
3.(b) $3 \times 5 \times p = 90$ or $90 \div (3 \times 5)$ or equivalent $(p =)$ 6	M1 A1	M1 for complete method. Allow M1A1 for a correct embedded answer (e.g. $3 \times 5 \times 6 = 90$), BUT M1A0 if contradicted by $p \neq 6$). Unsupported 6 is awarded M1A1.
4.(a) $9{\cdot}17 \div 7 \times 3$ or equivalent 3·93 (km) 3930 (m)	 M1 A1 B1	Answer space takes precendence. May be seen in stages. FT 'their 3·93' × 1000.
4.(a) Alternative method (converting to m first) *9170 (m)* *9170 ÷ 7 × 3 or equivalent* *3930 (m)*	 *B1* *M1* *A1*	*Answer space takes precedence.* *FT 'their 9170' ÷ 7× 3 provided that the digits 917 are seen (i.e place value error).*
4.(b) $\frac{25}{2 \times 60 + 5}$ (× 100%) or equivalent = 20 (%)	M2 A1	Allow 0·2 or $\frac{1}{125 \div 25}$ or $\frac{1}{5}$ to imply M2. Award M1 for an attempt at $\frac{25}{2\ hours\ 5\ minutes}$ but with incorrect denominator (e.g. 2·5, 2·05, 2 hours 5 minutes stated incorrectly with $2 \times 60 + 5$ not shown). CAO Mark final answer. If no marks awarded, award SC1 for sight of 125 (minutes).
4(b). Alternative Method *125 minutes = (100%)* *12·5 minutes = 10%* *25 minutes = 20%*	 *B1* *M1* *A1*	 *CAO* *Mark final answer.*

<table>
<tr><td>5.(a) 36</td><td>B1</td><td>Allow B1 for a correct embedded answer
(e.g. 36 ÷ 4 = 9 BUT B0 if contradicted by total ≠ 36).

Allow the sequence 9, 18, 27, 36 for B1, but only if no further numbers are shown.</td></tr>
<tr><td>5.(b) Four numbers including 11, 11 AND a pair of non-identical numbers whose sum is 14

<table><tr><td>1</td><td>13</td><td>11</td><td>11</td></tr><tr><td>2</td><td>12</td><td>11</td><td>11</td></tr><tr><td>3</td><td>11</td><td>11</td><td>11</td></tr><tr><td>4</td><td>10</td><td>11</td><td>11</td></tr><tr><td>5</td><td>9</td><td>11</td><td>11</td></tr><tr><td>6</td><td>8</td><td>11</td><td>11</td></tr></table></td><td>B2</td><td>Numbers may be seen in any order.
Accept answers using fractions, decimals or negative numbers.

FT 11, 11 AND two numbers whose sum is ‘their total’ from (a) – 22 for a possible B2 or B1.

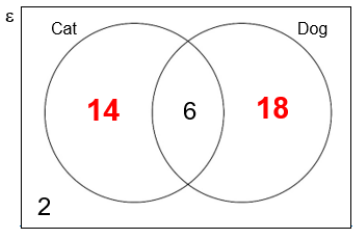
Award B1 for four numbers with one of the following:
• total = 36
• total = ‘their total’ from 5(a)
• four numbers with a unique mode of 11 (11, 11, ?, ? or 11, 11, 11, ? or 11, 11, 11, 11)
• 7, 7, 11, 11.</td></tr>
<tr><td>6.(a)
1 − 0·3 − 0·1 − 0·25 or equivalent
= 0·35 or equivalent</td><td>
M1
A1</td><td>The value in the table takes precedence.
Award M1 for complete method.</td></tr>
<tr><td>6.(b) 24</td><td>B2</td><td>Award B2 for a final answer of 24 : 20 or 20 : 24.

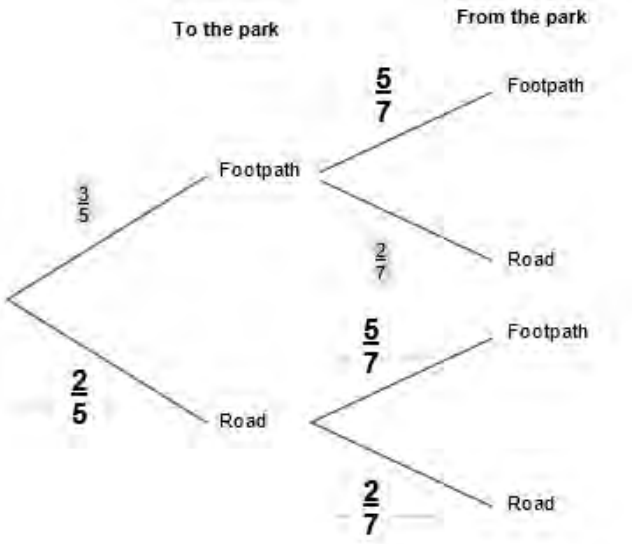
Award B1 for one of the following:
• 20 ÷ 0·25 × 0·3
• 80 – (8 + 28 + 20)
• 25% → 20 5% → 4 30% → 20 + 4
• 0·3 × 80 or 20 × 1·2 or …
• sight of 80
• other complete method
• unsupported 24 as a numerator in a fraction <1.</td></tr>
</table>

7. (length of small shaded square =) $\sqrt{16}$ or equivalent **OR** (length of large shaded square =) $\sqrt{144}$ or equivalent	M1	Check diagram for answers. Allow $16 \div 4 = 4$.
(length of small shaded square =) 4 (cm)	A1	Sight of 4 or 12 implies M1.
(length of large shaded square =) 12 (cm)	A1	
(total area of unshaded regions =) 96 (cm^2)	B2	FT 'their derived 4' $\times$ 'their derived 12' $\times$ 2 Award B1 for one of the following: • sight of 48 (cm^2) • 4×12 • 'their derived 4' $\times$ 'their derived 12'.
7. <u>Alternative Method (find total area of square)</u>		*Check diagram for answers.*
(length of small shaded square =) $\sqrt{16}$ or equivalent ***OR*** *(length of large shaded square =) $\sqrt{144}$ or equivalent*	*M1*	Allow $16 \div 4 = 4$
(length of small shaded square =) 4 (cm) *(length of large shaded square =) 12 (cm)*	*A1* *A1*	*Sight of 4 or 12 implies M1.*
(total area of unshaded regions =)$(4+12)^2 - 16 - 144$ *96 (cm^2)*	*M1* *A1*	*Note: 256 - 160* *Award M1 for complete method.* *FT ('their derived 4' + 'their derived 12')^2 – 16 – 144*
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

8. $7y - 2 = 4y + 1 + 9$ or $7y - 2 = 4y + 10$ $7y - 4y = 10 + 2$ $3y = 12$ $y = 4$	B1 B1 B1 B1	FT until 2nd error. Allow $7y - 2 - \mathbf{9} = 4y + 1$ or $7y - 11 = 4y + 1$ Allow $7y - 4y = 1 + 11$. Mark final answer. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. An embedded, unsupported answer or an answer following trial and improvement of 4 without showing $7y - 2 = 4y + 1 + 9$ or equivalent gains B1 only. Note: $7y - 2 + \mathbf{9} = 4y + 1$ B0 $7y - 4y = 1 - 7$ B1 $3y = -6$ B1 $y = -2$ B1 $7y - 2 = 4y + 1 - \mathbf{9}$ B0 $7y - 4y = -8 + 2$ B1 $3y = -6$ B1 $y = -2$ B1 $7y - 2 = 4y + 1$ B0 $7y - 4y = 1 + 2$ B1 $3y = 3$ B1 $y = 1$ B1 If $3y = -6$ or $3y = 3$ seen with no previous workings, award B0 B1 B1 with a possible final B1 if correct answer seen. **If no marks awarded**, award SC1 for sight of the following: • $7y + 7 = 4y + 1$ (adding 9 on the wrong side) • $4y + 10$ • $7y - 11$ (from correct working).
9. (Amount of tea in full cup =) (44 ÷ 2) × 7 or equivalent = 154 (ml)	M1 A1	M1 for full complete method. May be seen in stages. If M0 awarded, award SC1 for one of the following: • appropriate sight of 22 • final answer of 61·6 (ml) (from (44 ÷ 5) × 7).
9. <u>Alternative method</u> *(Amount of tea in full cup =)* *(44 ÷ 2) × 5 + 44* *= 154 (ml)*	*M1* *A1*	*M1 for full complete method.* *May be seen in stages.* *If M0 awarded, award SC1 for appropriate sight of 22.*
10.(a) 10	B2	Award B1 for appropriate sight of 100. Mark final answer.
10.(b)(i) 3	B2	Award B1 for sight of $\sqrt[3]{27}$. Mark final answer.
10.(b)(ii) $(\sqrt[3]{8 \times 25x})^3 = 10^3$ or $200x = 1000$ or equivalent (x =) 5 ISW	M1 A1	Award M1 for $8 \times 25x = 10^3$. CAO Unsupported answer of 5 is awarded M1A1. Allow M1A1 for a correct embedded answer (e.g. $5 \times 8 \times 25 = 1000$), BUT M1A0 if contradicted by $x \neq 5$).

11.(a) $4n + 7$ or equivalent	B2	Mark final answer. Award B1 for sight of $4n$. Award B0 for $-4n$.
11.(b) –4, –1, 4	B2	Answer space takes precedence. Award B1 for one of the following: • two correct terms • –5, –4, –1 • –1, 4, 11.
12. (a) For a correct method that produces 2 prime factors from the set {3,3,5,11} before 2nd error.	M1	Must be a method that involves only division. Check for errors in the method before checking the 2 prime factors from the set. (Note: 495 = 3 × 165 495 = 5 × 99 495 = 11 × 45)
3, 3, 5, 11	A1	CAO For sight of the four correct factors (Ignore 1s).
$3^2 \times 5 \times 11$	B1	Do not FT non-primes. FT 'their primes' provided at least one index form used with at least a square. Allow $(3^2)(5)(11)$ and $3^2.5.11$ Do not allow 3^2,5,11 Inclusion of 1 as a factor gets B0.
12. (b) Any valid reason referring to not all the indices being even e.g "the powers are not (all) even" "only one index is even"	E1	Allow reference to $22^2 = 484$ and $23^2 = 529$. Do not accept "they are not (all) even" "all factors are not (all) even" "the 5 and 11 are not squared" "the prime factors are all odd" "the little numbers are not even".
12. (c) 60 = 2 × 2 × 3 × 5 or equivalent correct strategy	M1	M1 for sight of 2,2,3,5 'together'. Allow M1 for selection of 2 × 2 × 15 or 4 × 15 (Not for other products e.g. 2 × 30, 3 × 20, 5 × 12, 6 × 10) (Not for just listing all the factors 1,2,3,4,5,6,10,12,15,20,30,60)
(HCF =) 15	A1	Mark final answer. M1A0 for 3 × 5. FT 'their answer to 12(a)' only if equivalent difficulty (at least two common prime factors). Unsupported 15 gains M1 A1. If no marks awarded, award SC1 for sight of all common factors (1, 3, 5 and 15) and no other factors.

13. [n(just dog) =] 18 [n(just cat) =] 14  	B2 B1	Diagram takes precedence. Entries must be whole numbers. B1 for sight of ($\frac{3}{5} \times 40 =$) 24 from correct working. FT 32 – 'their 18', provided all sections not blank or 0.
14.(a) £285 × $0{\cdot}96^3$	B1	
14.(b) $\frac{34.2}{90} \times 100$ OR $\frac{34.2}{0.9}$ or equivalent = 38	M1 A1	Accept a **complete** and **convincing** method of trial and improvement. Award M1A1 for an embedded answer (e.g. 0·9 × 38 = 34·2 or $\frac{34.2}{38} \times 100$ = 90%), BUT only M1A0 if contradicted by stating original amount ≠ 38. Unsupported 38 is awarded M1A1.
15. (a) Any full valid explanation with reference to one or both correct scale factors (if fractions used, must be with a common denominator or in their simplest form) e.g. "the scale factor for one (corresponding) pair of sides is 1·5, the other is 1·25" "9/6 = 1·5 1·5 × 8 = 12 1·5 × 8 ≠ 10" "8/6 = 4/3 which is not the same as 10/9" "3/2 and 5/4 are not the same" "in A, the width is ¾ of the length, but in B it is not"	E2	Award E1 for partial explanation e.g. • "the scale factor is not the same for each pair of sides" • "10/8 is not the same as 9/6" • "10/9 ≠ 8/6" • "9 : 10 ≠ 6 : 8" • "8/10 is not the same as 6/9" • "the sides should be 12 (cm) and 9 (cm)" • "the sides should be 10 (cm) and 7·5 (cm)" **OR** Award E1 for • two scale factors which can be compared (one must be correct) e.g. 1·5 and 1·3 or two fractions with a common denominator (4/2 and 3/2).
15.(b) Method 1 *8 × 9/6 or 8 × 1·5 or equivalent* *Length = 12 (cm) and Width = 9 (cm)*	*M1* *A1*	*Answer space takes precedence.* *M1 for correct use of linear ratio.* *Allow Length = 9 (cm) and Width = 12 (cm)*
15.(b) Method 2 *6 × 10/8 or 6 × 1·25 or equivalent* *Length = 10 (cm) and Width = 7·5 (cm)*	*M1* *A1*	*Answer space takes precedence.* *M1 for correct use of linear ratio.* *Allow Length = 7·5 (cm) and Width = 10 (cm)*

16. (a) Complete diagram  	B2	**If B2 not awarded**, award B1 for **one** of the following: • 2/5 or equivalent on Road to the park branch • 5/7 on a Footpath from the park branch.
16.(b) $\frac{3}{5} \times \frac{5}{7}$ or equivalent $\frac{15}{35}$ or equivalent ISW	M1 A1	FT $\frac{3}{5}$ × 'their $\frac{5}{7}$' (on 'uppermost footpath home branch') provided less than 1.
17. $(x-10)(x+2)$ $(x=)\ 10$ AND $(x=)\ -2$	B2 B1	B1 for one of the following: • $(x \ldots 10)(x \ldots 2)$. • two brackets which multiply to give $x^2 - 8x + k$ • two brackets which multiply to give $x^2 + kx - 20$. **Strict FT** from their pair of brackets. If no factorising shown, allow the following. B2 for $x-10\ (=0)$ AND $x+2\ (=0)$ (B1) $(x=)\ 10$ AND $(x=)\ -2$ (B1) B1 for $x+10\ (=0)$ AND $x-2\ (=0)$ (B0) $(x=)\ -10$ AND $(x=)\ 2$ (B1) FT B1 if only $(x=)\ 10$ AND $(x=)\ -2$ seen (B1)
18.(a) Statement explaining that, 'The **tangent** at any point on a circle is **perpendicular** (or equivalent) to the **radius** at that point'.	E1	Accept unambiguous similar wording. e.g. 'Radius and tangent 90(°)' 'The angle between a tangent and radius is 90(°)' Diameter could be used in place of radius. Must refer to tangent and radius by name (not simply *AF* and *OB* or description).
18.(b) (*AOB* =) 180 – 90 – 42 or 90 – 42 48 (°) x = 24(°)	 M1 A1 B1	Check diagram for answers. Note: 180 – 132 May be implied by sight of a final answer of 24. FT 'their 48' ÷ 2, provided 'their 48' ≠ 42.
18.(b) Alternative method *(x =) 180 – 90 – 42 or 90 – 42* *2 2* *x = 24(°)*	 *M2* *A1*	*Check diagram for answers.* *Award M2 for complete method.*

19. Correct equation e.g. $\frac{50x + 10 - 21x + 9}{(15)} = \frac{9 \times 3 \times 5}{(15)}$ $(29x + 19 = 135)$ $29x = 116$ $x = 4$	B2 B1 B1	FT until 2nd error. Award B1 for one of the following: • 1 error in one term • Sight of $5(10x + 2)$ AND $-3(7x - 3)$ or equivalent • Sight of $50x + 10 - 21x + 9$. Subsequent work may show use of common denominator in order to award the B2. Mark final answer. Award the final B0 for $\frac{116}{29}$. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise, accept a fraction. Allow B2B1B1 for a correct embedded answer BUT only B2B1B0 if contradicted by $x \neq 4$ or equivalent. Note 1: $\frac{50x + 10 - 21x - 9}{(15)} = \frac{135}{(15)}$ B1 (one error –9) $29x = 134$ B1 $x = \frac{134}{29}$ B1 Note 2: $\frac{50x + 10 - 21x + 9}{(15)} = \frac{9}{(15)}$ B1 (one error =9) $29x = -10$ B1 $x = \frac{-10}{29}$ B1 Note 3: $\frac{50x + 10 - 21x - 9}{(15)} = \frac{9}{(15)}$ B0 B0 B0 (2 errors –9 & 9) Award B2B1B1 for unsupported answer of 4, or for an answer which has come from a non-algebraic method.