GCSE MARKING SCHEME

AUTUMN 2021

GCSE
MATHEMATICS
UNIT 1 – INTERMEDIATE TIER
3300U30-1

INTRODUCTION

This marking scheme was used by WJEC for the 2021 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 2021 MARK SCHEME

Unit 1: Intermediate Tier	Mark	Comments
1.(a) (x =) 180 – 90 – 37 or equivalent. = 53(°)	M1 A1	
1.(b) (a =) 51(°) (b =) 360 – (51 + 82 + 153) or equivalent. = 74(°)	B1 M1 A1	FT 'their 51', i.e. 125 – 'their 51' provided 'their 51' < 125.
2.(a) $\frac{1}{9}$	B1	
2.(b) 0·016	B1	
2.(c) 0·015	B1	
3.(a) $\frac{1}{10}$ or 0·1	B1	Mark final answer.
3.(b) Sight of 27 AND 4 (27 ÷ 4 =) 6·75	B1 B1	FT if at least 27 or 4 correct and of equivalent difficulty (i.e. not leading to a whole number answer). Answer must be a decimal
4.(a) (Volume =) 5 × 3 × 2 = 30 (cm^3)	M1 A1	Any additional calculation e.g. 30 ÷ 2 = 15 is M0.
4.(b) Sight of 5 × 3 (=15) AND 5 × 2 (=10) AND 3 × 2 (=6) (Total Surface Area =) (5×3 + 5×2 + 3×2) × 2 62 (cm^2)	B1 M1 A1	 For addition of all six surface areas. (Must be three different pairs.) FT 'their 15', 'their 10' and 'their 6' C.A.O.
5. Sight of 9 AND 49 n + 9 = 49 (n =) 40	B1 M1 A1	Any unambiguous indication that this linear relationship is being considered (including 'trial and improvement'). FT their $\sqrt{81}$ (≠81) AND their 7^2 (≠7) for M1 and possibly A1 if at least one correct value used. FT for M1 only if neither correct value used. Award M1 if 49 – 9 seen. Mark final answer.
6. Indicates 2 (letters out of 6 gain points) (Expected number of wins =) $\frac{2}{6}$ × 24 or equivalent = 8 (Points gained =) 8 × 10 = 80 (points) AND 'No' (Leah is not expected score 100 points)	B1 M1 A1 M1 A1 	Any unambiguous indication. FT 'their stated number of '10 point' letters'. Award M1A1 for 8/24 suggesting '8 wins out of 24' FT 'their derived 8' × 10 only if 'their derived 8' < 24. FT their derived number of points
Alternative method 1 *Indicates 2 (letters out of 6 gain points)* *(Each letter expected to be drawn) $\frac{24}{6}$ (times)* *= 4 (times)* *(Points gained =) 4 × 2 × 10* *= 80 (points) AND* *'No' (Leah is not expected score 100 points)*	 *B1* *M1* *A1* *M1* *A1* 	 *Any unambiguous indication.* *FT 'their derived 4' and 'their stated 2'.* *FT their derived number of points.*

Alternative method 2 *. Indicates 2 (letters out of 6 gain points)* *(Expected number of wins =) $\frac{2}{6} \times 24$ or equivalent* *= 8* *(Number of wins required =) $\frac{100}{10}$* *= 10 (wins) AND* *'No' (Leah is not expected score 100 points)*	*B1* *M1* *A1* *M1* *A1*	*Any unambiguous indication.* *FT 'their stated number of '10 point' letters'.* *Award M1A1 for 8/24 suggesting '8 wins out of 24'* *FT their derived number of expected wins.* *Note for Alternative method 2* *If 'number of wins required' is calculated before calculating 'number of expected wins' then the conclusion ('AND') will be attached to the 8 rather than the 10.*
OCW 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
7. $4x + 5 = 57$ or equivalent $4x = 52$ $x = 13$	M1 A1 A1	 FT from $4x = k$. Accept $x = k/4$ (but, if on FT k is a multiple of 4, final answer must be given as a whole number.) M1A1A0 for 'x = 52/4' Mark final answer. Allow (M1)A1A1 for a correct embedded answer BUT only (M1)A1A0 if contradicted by $x \neq 13$.
8. 3, 4, 4, 9 OR 3, 3, 5, 9.	B3	B1 for a range = 6. B1 for a total = 20. B1 for a median = 4. Penalise use of negative or non-integer values −1. FOUR numbers must be shown, otherwise B0.
9.(a) $\frac{54}{300} \times 100$ or equivalent = 18(%)	M1 A1	Allow sight of 18/100 or 0·18 for M1. M0 for 54/300 alone.
9.(b) Use of Distance / Time $\frac{100}{2{\cdot}5}$ or equivalent = 40 (mph)	M1 M1 A1	Allow M1 even for e.g. 100 / 2·3(0) or 100/150. C.A.O.
10. (a + b = 180 – 25) = 155 (a =) $\frac{155}{5} \times 2$ OR (b =) $\frac{155}{5} \times 3$ or equivalent a = 62(°) AND b = 93(°)	B1 M1 A1	B1 for sight of 155 FT 'their stated 155'. Allow M1A0 if the angles are reversed and not corrected.

11.(a) 360	B2	Mark final answer. B1 for $2^3 \times 3^2 \times 5$. OR B1 for any other common multiple e.g. 720, 1080 etc. unambiguously identified as a final answer. OR B1 for sight of correct <u>prime factors</u> e.g. $60 = 2^2 \times 3 \times 5$ or equivalent. <u>AND</u> $72 = 2^3 \times 3^2$ or equivalent. OR Accurate Venn diagram showing correct prime factors. OR B1 for sight of 60, 120, 180, 240, 300, 360, …. <u>AND</u> 72, 144, 216, 288, 360 with no further numbers
11.(b) For a single method that produces 2 prime factors from the set {2, 3, 3, 7, 7} before the 2nd error.	M1	Must be a method of 'repeated division'.
2, 3, 3, 7, 7	A1	C.A.O. For sight of the five correct factors (Ignore 1s)
$2 \times 3^2 \times 7^2$	B1	F.T. 'their primes' provided at least one index form used with at least a square. Do not F.T. non-primes. Allow $(2)(3^2)(7^2)$ and $2.3^2.7^2$ Do not allow $2,3^2,7^2$. Inclusion of 1 as a factor gets B0.
12. 6 −2	B2	B1 for each.
At least 5 correct plots and no incorrect plot.	P1	F.T. 'their (−1,6)' AND 'their (3,−2). Allow ±'½ a small square'.
A smooth <u>curve</u> drawn through their plots.	C1	F.T. 'their 7 plots' OR a curve through the 5 given plots AND (−1,6) AND (3,−2). Allow for the intention to pass through their plots. (within 1 small square, either horizontally **<u>or</u>** vertically of the point).
13. (Curved length =) 3·14 × 4 or equivalent = 12·56 (cm)	M1 A1	Do not allow M1 if subsequently divided by 2. Allow 4π for M1A1 Allow SC1 for an answer of 25·12 (whole circle). (If 12·56 shown, but then doubled, only award the SC1)
(Perimeter =) 20·56 (cm)	B1	FT 'their derived 12·56' + 8. (Even 'an area' + 8) Allow 4π + 8.

14.(a) $3k = p - 2$ or $p - 2 = 3k$ or $-3k = -p + 2$ $k = \frac{p-2}{3}$ or $\frac{p-2}{3} = k$ or $k = \frac{-p+2}{-3}$	B1 B1	F.T. only from $\pm 3k = \pm p \pm 2$, stated or implied. ($3k = p - 2$ will have already gained the previous B1.) B1B0 for $-k = \frac{-p+2}{3}$ or equivalent. Mark final answer. *Note* *Allow B1B0 for $k = (p - 2) \div 3$ with or without brackets.* *Allow B1B0 for $\frac{p-2}{3}$ ('k' missing)*
14.(b) (Midpoint =) (5, 17)	B2	B1 for each coordinate. May be given as $x = 5$ and $y = 17$. Accept use of $x = 5$ and $y = 17$ in $y = 3x + 2$. Allow B1 for sight of $\frac{3+7}{2}$ or $\frac{7-3}{2} + 3$ OR $\frac{15+19}{2}$ or $\frac{19-15}{2} + 15$ Allow SC1 for unsupported (17, 5).
Showing that $17 = 3 \times 5 + 2$ (convincing) AND 'Yes'	B1	FT 'their stated midpoint', but not (3,15) nor (7,19), with consequent calculation AND decision.
15.(a) $5{\cdot}8 \times 10^{-3}$	B1	
15.(b) 7×10^{5}	B2	B1 for sight of correct value not in standard form e.g. $0{\cdot}7 \times 10^{6}$ or 700000. Mark final answer.
16.(a) P(South Wales =) $1 - 0{\cdot}3 - 0{\cdot}25$ $= 0{\cdot}45$ AND shown on relevant branch. $0{\cdot}2$ and $0{\cdot}8$ shown on **all** relevant branches.	M1 A1 B1	
16.(b) $0{\cdot}45 \times 0{\cdot}2$ or equivalent $= 0{\cdot}09$ or equivalent	M1 A1	FT 'their completed tree diagram' for values $0<p<1$.
17. Showing $4x + 3y = 19$ or equivalent. Showing $6x - y = 12$ or equivalent. A correct method to eliminate one variable e.g. 'equal coefficients AND appropriate addition or subtraction'. OR ' method of substitution'. First variable found , $x = 2\frac{1}{2}$ or $y = 3$. Second variable found	B1 B1 M1 A1 A1	$2x + 2x + 3y = 19$ is an equivalent answer. *Workings must be shown for M1A1A1.* FT to solve for simultaneous equations if of equivalent difficulty. Allow one error in one term (not the term with equal coefficients.) C.A.O. for their equations FT substitution of their '1st variable' if M1 gained If NO (i.e. none of the five) marks gained, allow SC1 for both answers of $x = 2\frac{1}{2}$ AND $y = 3$