GCSE MARKING SCHEME

AUTUMN 2020

GCSE
MATHEMATICS – UNIT 2 (INTERMEDIATE TIER)
3300U40-1

INTRODUCTION

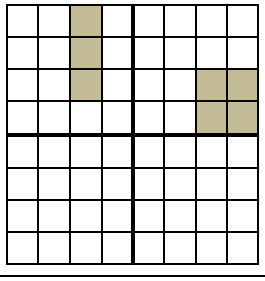
This marking scheme was used by WJEC for the 2020 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' 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 2020 MARK SCHEME

GCSE Mathematics Unit 2 Intermediate Tier	Mark	Comments
1.(a)(i) 16	B1	
1.(a)(ii) 2160	B2	B1 for sight of 2155(·…..) OR 2150 OR 2156. Mark final answer.
1.(b) 0·62 × 7·8 or equivalent. = 4·836 ISW	M1 A1	Unsupported 4·8…. implies M1. Accept $4^{209}/_{250}$ (ISW). Allow 1209/250 (ISW)
1.(c)(i) 247	B1	
1.(c)(ii) 2197	B1	
2.(a) 6 −5	B2	B1 for 6. B1 FT for correct evaluation of 'their 6' – 11 **only** if it leads to a negative answer.
2.(b) 15	B2	B1 for sight of 28·8 OR −13·8. Mark final answer.
3. $\frac{400}{17{\cdot}5}$ or $\frac{4}{0{\cdot}175}$. = 22·8(….) or 22·9 (Number of rods =) 22	M2 A1 B1	M1 if incorrect place value (in either length). Digits 228….. implies M1. C.A.O. FT if of equivalent difficulty. (i.e. 'their 22·8' must be greater than 1 AND their 1st decimal place number greater than or equal to 5.) Answer of 22 gains all 4 marks. Unsupported answer of 23 gains M2A0B0.
3. Alternative method (trial and improvement) *Working with a multiple of 17·5 or 0·175.* *(n × 17·5 or n × 0·175)* *22 × 17·5 (= 385) or 22 × 0·175 (= 3·85)* *23 × 17·5 (= 402·5) or 23 × 0·175 (= 4·025)* *(Number of rods =) 22*	*S1* *B1* *B1* *B1*	*Award this S1 only if* *n > 2 and n ≠ 4 and n ≠ 400.* *This implies previous S1.* *This implies previous S1 and previous B1 if 402·5 seen.* *Must be seen in answer space or unambiguously identified (not simply embedded).* *Answer of 22 gains all 4 marks.* *Unsupported answer of 23 gains S1B0B1B0.*
4.(a) **All** labels correctly inserted (Number) **1 2 3 4 5** **Red** (Colour) **Yellow** (Pink) All outcomes correctly inserted	B1 B1	Must be inserted in the table and not simply inferred from the outcomes. Accept 'R' for Red and 'Y' for Yellow. Allow 'Red' for 'R' etc. Allow '1R' for 'R1' etc.
4.(b) $\frac{2}{15}$ or equivalent ISW.	B2	*(No FT from an incorrect grid in 4a)* B1 for a numerator of 2 in a fraction < 1. B1 for a denominator of 15 in a fraction < 1. Allow B2 for 0·13… Penalise −1 for incorrect notation eg '2 out of 15', '2 : 15' etc.
5.(a) 	B2	B1 for either individual shape. Ignore clearly deleted shading.

5.(b) Reflection (in the line) x = 5	B2	B1 for stating 'Reflection'. Ignore extra wording once 'reflection' (or 'reflected') seen. B1 for stating x = 5 (simply drawing the line is B0)
6.(a) 10x + 15 = 20 OR 2x + 3 = 4 10x = 5 OR 2x = 1 x = 5/10 OR x = 1/2 or equivalent	B1 B1 B1	FT until 2nd error. Mark final answer. Allow an embedded answer but penalise −1 if contradicted by x ≠ ½ or 0·5.
6.(b) 7(a + 3)	B1	Allow 7(1a + 3) Mark final answer.
6.(c) 5(*n* − 3) or 5×(*n* − 3) or (*n* − 3)5 or (*n* − 3) × 5 or 5*n* − 15	B2	B1 for sight of *n* − 3 × 5 OR sight of 5 × *n* − 3. B0 for unsupported *n* − 15 OR unsupported 5*n* − 3. Allow 'n = 5(n – 3)' etc Mark final answer.
7.(a) YES AND a valid explanation. e.g. ' the other two angles would be (both) 20(°)' e.g. diagram showing (isosceles) triangle with angles of 140°, 20° and 20°.	E1	A valid explanation implies YES circled if not otherwise contradicted (by circling NO). Explanations must engage with the specific triangle given (with an angle of 140°) and not isosceles triangles in general.
7.(b) NO AND a valid explanation. e.g. '120(°) + 30(°) ≠ 180(°)' 'the two angles add to 150(°), not 180(°) '120(°) + 30(°) + 120(°) + 30(°) ≠ 360(°)' 'the four angles add to 300(°), not 360(°)	E1	Allow 'the two angles must equal 180°'. Do not accept 'the four angles must equal 360°' unless it is made clear that the rhombus has two pairs of equal angles. A valid explanation implies NO circled if not otherwise contradicted (by circling YES).
7.(c) a + b = 150	B1	
8. [n(G ∩ S) =] 10 [n(S) =] 13	 B1 B1	Entries must be a whole numbers. [n(Ɛ)] must be 30 (i.e. no additional 'non-Spanish'). Any blank space to be taken as 0.
9. (Length of AD or BC =) 10 (cm)	B1	May be seen on the diagram or implied in later work.
(Area of ABCD = 5 × 10 =) 50 (cm^2)	B1	FT 5 × 'their AD (or BC)'. The 50(cm^2) may be shown as two areas of 25(cm^2) for B1 B1.
(Area APB =) $\frac{\pi \times 5^2}{4}$	M1	
= 19·6(…..)(cm^2)	A1	SC1 for sight of $\pi \times 5^2$ or equivalent (78·5….)
(Shaded area = 50 − 19·6 =) 30·3(…) or 30·4(cm^2)	B1	FT 'their stated area ABCD' – 'their stated area APB' *Note: Sight of (25 – 'area of APB') + 25 implies the first two B marks. [rectangle divided in half]*
9. OCW 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

10.(a) $\frac{1}{6} \times \frac{1}{4}$ or equivalent $= \frac{1}{24}$ ISW	M1 A1	Accept 0·0416… or 0·0417 or 0·042 for M1A1 M1A0 for '1 in 24', '1:24'.
10.(b) $\frac{1}{5} + \frac{1}{10}$ or equivalent. $= \frac{3}{10}$ or equivalent. ISW	M1 A1	
11. $(AC^2 =)\ 10{\cdot}8^2 + 14{\cdot}4^2$ $AC^2 = 324$ or $(AC =)\ \sqrt{324}$ $(AC =)$ 18(cm) (Area ACD =) $\frac{24 \times 18}{2}$ $= 216\ (cm^2)$	M1 A1 A1 M1 A1	Accept equivalent of using cos rule (as cos 90 = 0). F.T. √'their 324' provided M1 gained. Final answer of AC = 324 is M1A0A0. *Alternative method to find AC* *A correct and complete method (using two trigonometric relationships)* *M2* *AC = 18(cm)* *A1* FT 'their stated AC'. (May be shown on the diagram) Accept equivalent of using ½ × 24 × 18 × sin 90 (as sin 90 = 1).
12. One correct evaluation $7{\cdot}2 \le x \le 7{\cdot}3$ 2 correct evaluations $7{\cdot}275 \le x \le 7{\cdot}295$, one < 0, one > 0. 2 correct evaluations $7{\cdot}275 \le x \le 7{\cdot}285$, one < 0, one > 0. $x = 7{\cdot}28$	 B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if negative or positive. If evaluations not seen accept 'too high' or 'too low'.* *Look out for equating $x^3 - 5x = 350$* x $x^3 - 5x - 350$ 7·2 −12·75(2) 7·21 −11(·2..) 7·22 − 9(·7…) 7·23 − 8(·2…) 7·24 − 6(·6…) 7·25 −5(·1...) 7·26 − 3(·6…) 7·275 −1(·3….) 7·27 − 2(·1…) 7·284 0(·04..) **7·28** **−0·5(7..)** **7·285** **0·1(9..)** **7·29** **0·9(7..)** 7·295 1(·7….) 7·3 2·5(17)
13.(a) an expression	B1	
13.(b) an equation	B1	
14. (Mid-points) 2·5, (7·5), 12·5 and 17·5. $8 \times 2{\cdot}5 + (0 \times 7{\cdot}5) + 7 \times 12{\cdot}5 + 5 \times 17{\cdot}5$ (20 + 0 + 87·5 + 87·5 = 195) ÷ 20 = 9.75	B1 M1 m1 A1	Allow for sight of mid-points. F.T. 'their mid-points' including bounds, provided they fall within the classes (including lower and upper bounds and used consistently). C.A.O.
15. (x =) $\frac{360}{15}$ or $180 - \frac{(15-2) \times 180}{15}$ or equivalent = 24(°) (BR =) 8 × cos 24 or 8 × sin (90 – 24) = 7·3(0…)(cm) or 7·31(cm)	M1 A1 M2 A1	May be seen in parts. FT 'their stated value for x' (x < 90°) M1 for $\frac{BR}{8}$ = cos 24 or $\frac{BR}{8}$ = sin (90 – 24) Accept equivalent of using sin rule (as sin 90 = 1). *Alternative method to find BR* *A correct and complete method (using two trigonometric relationships and possibly Pythagoras's theorem)* *M2* *BR = 7·3(0…)(cm) or 7·31(cm)* *A1*

16. $2{\cdot}656 \times 10^6$	B2	B1 for a correct value but not in standard form. Mark final answer. B1 for sight of 2 656 000. SC1 for $2{\cdot}66 \times 10^6$ or $2{\cdot}7 \times 10^6$ or $2{\cdot}6 \times 10^6$ or $2{\cdot}65 \times 10^6$
17. Sight of 24·5 AND 15·5 OR Sight of 23·5 AND 14·5 2(24·5 + 15·5) – 2(23·5 + 14·5) or equivalent = 4(cm)	B1 M1 A1	Sight of (Greatest =) 80 OR (Least =) 76 implies B1 FT only for upper bounds of 24·4 AND 15·4 or 24·49 AND 15·49 (lower bounds must be 23·5 AND 14·5 else M0) CAO If M0, award B1 and an SC1 for sight of (Greatest =) 80 AND (Least =) 76
Alternative method. *Difference between least and greatest length for each side = 1(cm)* *4 × 1* *= 4(cm)*	*B1* *M1* *A1*	 *FT only for differences of 0·9 or 0·99* *CAO*
18. Method to eliminate variable e.g. equal coefficients with appropriate addition or subtraction. First variable found, x = 4 or y = −1. Substitute to find the 2nd variable. Second variable found	 M1 A1 m1 A1	*No marks for trial and improvement.* Allow 1 error in one term, not the term with equal coefficients. C.A.O. F.T. their '1st variable'. Award no marks for unsupported correct answers.
19.(a)(i) Correct reason given. e.g. 'An angle at the circumference subtended by a diameter is a right angle'. ' line AC is a diameter'	E1	Accept any correct unambiguous wording. The key word is 'diameter'. Allow eg 'angle in a semicircle is 90°', 'line AC goes through the centre'. 'opposite a diameter' Do not accept 'because it's a right angle'.
19.(a)(ii) $\tan x = \frac{7{\cdot}5}{4{\cdot}7}$ $x = \tan^{-1}(7{\cdot}5 / 4{\cdot}7)$ or $\tan^{-1} 1.6$ or $\tan^{-1} 1.59(\ldots)$ = 57·9(…)(°) or 57·8(…)(°) or 58(°)	M1 m1 A1	 Implies M1. C.A.O. *Alternative method to find x* *A correct and complete method (using Pythagoras's theorem and a trigonometric relationship). M2* *x = 57·9(…)(°)* or 57·8(…)(°) *or 58(°) CAO A1*
19.(b) (y =) 58(°) Correct circle theorem given. e.g. 'angles (at the circumference) subtended by the same chord (or arc) are equal', 'angles in the same segment (are equal)'.	B1 E1	Strict FT of 'their x'. Accept any correct unambiguous wording. Allow eg 'angles on the same chord (are equal)' Do not accept e.g. 'they are equal' on its own.