GCSE MARKING SCHEME

AUTUMN 2021

GCSE
MATHEMATICS – NUMERACY
UNIT 2 – INTERMEDIATE TIER
3310U40-1

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 – NUMERACY

AUTUMN 2021 MARK SCHEME

Unit 2: Intermediate Tier		Mark	Comments
1(a)	202·5 m^2	B1	
1(b)	1215 m^2	B1	
2(a) Number of units	620	B1	
Charge for units	620 × (0.)18	M1	FT 'their 620', including if not a whole number Award for sight of digits 1116(0)
	(£) 111.6(0)	A1	Must be in pounds
(Standing charge)	(£ 18)		
Total charges	(£) 129.6(0)	B1	FT 'their 111.6(0)' + 18 correctly evaluated
VAT at 5%	(£) 6.48	B1	FT 5% of 'their 129.6(0)' correctly evaluated, allow rounded or truncated Allow for sight of (£) 136.08 in this box as implying (£) 6.48
Amount to pay	(£) 136.08	B1	FT provided at least one of the two previous B1 marks has been awarded

2(b)		**If an evaluation is given with incorrect units, penalise A mark -1 on the first occasion then FT**
2(b) Water interest 0.02 × 234 **AND** Gas interest 0.023 × 120 **AND** Loan interest 0.11 × 45 Water (£) 4.68 Gas (£) 2.76 Loan (£) 4.95 Total interest (£) 12.39	M2 A2 A1	Or equivalents M1 for any 1 or 2 correct methods A1 for any 1 or 2 correct evaluations Mark final answer, unless clearly stated as total interest FT for the sum of 3 amounts provided 2 of the amounts are correct
2(b) Alternative method*:* *Water payment 1.02 × 234* ***AND*** *Gas payment 1.023 × 120* ***AND*** *Loan payment 1.11 × 45* *Water (£) 238.68* *Gas (£) 122.76* *Loan (£) 49.95* *Total interest (£238.68 + £122.76 + £49.95 - £234 - 120 - 45 =) (£) 12.39*	*M2* *A2* *A1*	*Or equivalents* *M1 for any 1 or 2 correct methods* *A1 for any 1 or 2 correct evaluations* (= £411.39 – £399) *FT for the sum of 3 amounts – (234 + 120 + 45) provided 2 of these 3 amounts are correct*
Organisation and communication 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 explanations 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.
3(a) (Mass of sugar =) $1920 \times 3 \div 16$ or $\frac{3}{16} \times 1920$ 360 (g) (Number of eggs = 360 ÷ 90 =) 4 (Mass of sultanas = 360 ÷ 90 × 50 =) 200 (g)	M1 A1 B1 B1	Or 0.1875 × 1920 Do not accept from incorrect working FT 'their derived 360' ÷ 90, rounded or truncated to a whole number of eggs FT 'their derived 360' ÷ 90 or FT 'their 4' × 50 provided 'their 4' ≠ 1
3(b) 852 × 2 ÷ 3 or $\frac{2}{3} \times 852$ 568 (g)	M1 A1	 Mark final answer Allow M1 A0 for sight of 568(g) followed by additional working, e.g. 852 – 568 = 284(g)

4(a) Perimeter (circumference of the circular table) $\pi \times 1.5$ or $2 \times \pi \times 0.75$ 4.7(...m) Rectangular table perimeter 5.6 (m) **AND** the conclusion that rectangular perimeter is greater	 M1 A1 E1	 5.6 (m) must be seen or implied by the difference between 5.6 (m) and 'their circumference' FT depends on M1 previously awarded
4(b) Circular table area $\pi \times (1.5 \div 2)^2$ 1.76(... m^2) or 1.77 (m^2) or 1.8 (m^2) Rectangular table area 1.6 (m^2) **AND** the conclusion 'no' (the circular table area is greater)	M1 A1 E1	 Allow an answer truncated to 1.7(m^2) 1.6 (m^2) must be seen or implied by the difference between 1.6 (m^2) and 'their area of circle' STRICT FT from 'their conclusion in (a)' for the conclusion in (b), provided M1 previously awarded in (b) Answers in (a) / Answers in (b) / Conclusion rectangle > circle / rectangle < circle / no rectangle < circle / rectangle < circle / yes rectangle > circle / rectangle > circle / yes rectangle < circle / rectangle > circle / no *If they match it is 'yes', if they don't it is 'no'* *'Their conclusion' from (a) may be inferred* If 'yes' or 'no' is not stated then it must be unambiguously implied If no marks, award SC1 for meeting all three of the following requirements: **1**. $\pi \times 1.5^2 = 7(.0...m^2)$ or $7.1(m^2)$ OR $½ \times \pi \times 1.5^2 = 3.5(...m^2)$ **2.** Rectangular area 1.6 (m^2) OR implied by the difference between 1.6 (m^2) and 'their area of circle' **3.** Appropriate conclusion of 'yes' or 'no'
5(a) $1000 \times 250 \div 28350$ or $250000 \div 28350$ or $250 \div 28.35(0)$ 8.8(18...) (applications)	M2 A1	M1 for sight of appropriate digits with division with incorrect place value of mass(es) Do not allow for division inverted Do not FT from M1 Accept answers of 8 or 9 (applications) from correct working Ignore the unit of the answer given as 'ounces'
5(a) <u>Alternative method</u> *$28(.)350 \times 9 = 255(.)150$* *or $28(.)350 \times 8.8 = 249(.)480$* *8.8(18...) (applications)*	*M2* *A1*	*Or for use of a value between 8.8 and 9* *M1 for $28(.)350 \times 8 = 226(.)800$* ***and** possible* *M1 for 250(.)000 – 226(.)800 = 23200 (mg)* *(which is < 28350 mg)* *OR* *M1 multiple of $28(.)350 \times 9 = 255(.)150$* *or $28(.)350 \times 8.8 = 249(.)480$ with incorrect place value of mass(es)* *Do not FT from M1* *Accept answers of 8 or 9 (applications) from correct working* *Ignore the unit of the answer given as 'ounces'* *Note: Sight of $28(.)350 \times 8 = 226(.)800$ **only** with an answer of 8 (applications) is awarded M1 A1*

5(b) Method to compare, e.g. • (Small bottle per 250 ml) 2.5 × £1.42 or £1.42 × 250÷100 • (Large bottle per 100 ml) £3.65 ÷ 2.5 or £3.65 × 100 ÷ 250 • (Per 1000 ml) small £1.42 ×10 AND large £3.65 × 4 • (Per ml) small £1.42 ÷ 100 AND large £3.65 ÷ 250 • (Per 50 ml) small £1.42 ÷ 2 AND large £3.65 ÷ 5 • (ml per penny) 100 ÷ 142 AND 250 ÷ 365	M1	Needs to show comparing like quantity with like Ignore any units given for M1 only
Accurate comparison calculation, e.g. • (Small bottle per 250 ml) £3.55 • (Large bottle per 100 ml) £1.46 • (Per 1000 ml) small £14.20 AND large £14.60 • (Per ml) small £0.0142 or 1.42p AND large £0.0146 or 1.46p • (Per 50 ml) small £0.71 AND large £0.73 • (ml per penny) small 0.70(4..)ml(/p) AND large 0.68(4..)ml(/p) **AND** Conclusion, Small bottle (better value)	A1	If units are given they must be correct

6(a) 1.04 m^2	B1	
6(b) Positive	B1	
6(c) Garth's height 1.65 (m)	B2	Accept 165 cm written in the answer space, but must state cm, allow 165 cm without the 'm' crossed out Allow B1 for 165 written in the answer space B1 Correct working, Ella's height 1.6(0 m) or 160 (cm) or Garth's area of skin 1.7 (m^2) . Allow this: • if any of the above values are given in the answer space provided the correct units are written, allowing without 'm' crossed out, or • for either point (1.6, 1.54) unambiguously labelled Ella or the point (1.65, 1.7) unambiguously labelled Garth on the graph
6(d) (Height) 1.18 × 1.5 or equivalent 1.77(m) (Area of skin) 1.9(m^2)	M1 A1 A1	 CAO. Ignore any units given CAO. Ignore any units given

7(a) 37 + 34 + 20 + 28 + 21 140 (students)	M1 A1	Allow M1 for • any 4 of the 5 readings correct in a sum of 5 non-zero readings, or • for a total (≠140 but) 140 ± 2 • total of 140 seen with further working with 'their' final answer ≠ 140 Mark final answer
7(b) 5 to 10 seconds	B1	
7(c) 10 (seconds) to 15 (seconds)	 B2	Allow if considering the 0.5(n+1)th term throughout FT 'their 140' provided 'their 140' > 100 throughout Not from incorrect working Allow for an inclusive or exclusive range of times B1 for any of the following: • appropriate sight of 70 or 140 ÷ 2 • the answer 12.5 seconds
7(d) Selects or unambiguously implies '**Yes**' with a reason, e.g. 'no students in group 30 to 35 seconds', 'last students started in 25 to 30 second range'	E1	Allow the term 'finished' as meaning 'finished starting the task', e.g. 'Yes' with 'no student finished after 30 seconds' Allow, 'yes' with a reason, e.g. 'all students started before 30 seconds', 'data stopped after 30 seconds', 'no students in the last group' Allow selection of 'Can't tell' with a reason based on thinking 30 seconds may be included in the group 25 to 30, so some students could have taken exactly 30 seconds to start and not started within 30 seconds, that is thinking 'within 30 seconds' does not include '30 seconds' Do not accept 'Yes' with a reason, e.g. 'no students after 27.5 seconds', 'all students between 27.5 and 32.5 seconds could start within 30 seconds'
7(e) $\frac{37}{140}$ (× 100) or 0.25 × 140 or 0.25 × (37 + 34 + 20 + 28 + 21) or $\frac{37}{37 + 34 + 20 + 28 + 21}$ (× 100) 26(.42...%) or 35 (students) AND '**No**' indicated	M1 A1	FT 'their derived 140' from (a) provided >100 with numerator 37 or 'their 37' if seen in (a) Accept 0.26(...) only if 0.25 is seen

8. (To spend on $) OR (Convert to $) 13/20 × 500 500 × 1.36 = (£) 325 = ($) 680	M1 A1	May be embedded in further calculation
(Buying $) 13/20 × 500 × 1.36 ($) 442	M1 A1	FT 'their incorrectly evaluated 13/20 × 500'
(As lowest note $5 can only buy) ($) 440	B1	Allow equivalent given unambiguously in possible notes FT 'their derived 442' rounded down to the nearest multiple of 5 If ($)442 in the answer space, only award if clearly showing 'buying $440'
(This will cost) 440 ÷ 1.36 or 13/20 × 500 – (442 – 440) ÷ 1.36 or 325 – 2 ÷ 1.36 (£) 323.53 or (£)323.52(9…)	M1 A1	FT 'their derived 442' and 'their derived 440' provided it is a multiple of 5
(Money left to buy euros 500 – 323.53) (£)176.47	A1	FT provided to the nearest penny Do not FT from incorrect rounding of 'their £323.52(9…)' Note: 500 – 323.52 = (£)176.48 is A0 *If unambiguous and clear correct response seen in working, ignore a slip in transferring (£)176.47 to the answer space.* *Ignore answers reversed in the answer space*
8. <u>Alternative method</u>: *(To spend on $) OR (Convert to $)* *13/20 × 500 500 × 1.36* *= (£) 325 = ($) 680*	*M1* *A1*	*May be embedded in further calculation*
(Buying $) 13/20 × 500 × 1.36 *($) 442*	*M1* *A1*	FT 'their incorrectly evaluated 13/20 × 500'
(As lowest note $5 can only buy) ($) 440	*B1*	Allow equivalent given unambiguously in possible notes *FT 'their derived 442' rounded down to the nearest multiple of 5* *May be implied by use of $2*
($2 is worth) (442 – 440) ÷ 1.36 or 2 ÷ 1.36 *(£) 1.47(05..)*	*M1* *A1*	*FT 'their derived 442' and 'their derived 440' provided it is a multiple of 5*
(Money left to buy euros 500 – 325 + 1.47) (£)176.47	*A1*	*FT provided to the nearest penny* *Do not FT from incorrect rounding of 'their £1.47(05...)'* *If unambiguous and clear correct response seen in working, ignore a slip in transferring (£)176.47 to the answer space.* *Ignore answers reversed in the answer space*

9. (Volume of a jug) $\pi \times 5^2 \times 28$ Answer in the range 2198 (cm^3) to 2200 (cm^3) or 700π (cm^3)	M1 A1	 May be implied in further working
(Number of jugs needed) $170 \times 80 \div 2199.(...)$	M1	FT 'their derived volume of a jug' provided > 'their 170 × 80' ÷10
6.1(84… jugs) or 6.2 (jugs) or 6 (jugs) 3 (full jugs left over)	A1 A1	 FT 10 – 'their 6.18…' (depends on previous M1) *Note: For final M and A marks, allow if found from listing the capacity of a number of jugs*
9. Alternative method 1: *(Volume of 10 jugs) $10 \times \pi \times 5^2 \times 28$* *Answer in the range 21980 (cm^3) to 22000 (cm^3)* *or 7000π (cm^3)*	*M1* *A1*	 *May be implied in further working*
(Volume left over = volume 10 jugs – 80 servings) *$= 10 \times \pi \times 5^2 \times 28 - 80 \times 170$*	*M1*	*(= 21980 – 13600)* *FT 'their derived volume of 10 jugs' provided > 'their 170 × 80'* *(Note: Correct answer is the range 8380 to 8394 cm^3)*
(Number of jugs left over) 8380 ÷ 2199.(...)	*m1*	*(= 3.81...)* *FT 'their derived volume of 10 jugs' provided > 'their 170 × 80'*
3 (full jugs left over)	*A1*	*Note: For final M and A marks, allow if found from listing the capacity of a number of jugs*
9. Alternative method 2: *(Volume of a jug) $\pi \times 5^2 \times 28$* *Answer in the range 2198 (cm^3) to 2200 (cm^3)* *or 700π (cm^3)*	*M1* *A1*	 *May be implied in further working*
(Number of jugs left over) $10 - 80 \div (2199.(..) \div 170)$ *$(= 10 - 80 \div 12.935...)$*	*M2*	*FT 'their derived volume of a jug' provided > 'their 170 × 80' ÷10* *M1 for sight of $80 \div (2199.(..) \div 170)$ (=6.1(84...))*
3 (full jugs left over)	*A1*	*Do not allow A1 from truncation of 12.9(...) to 12*
9. Alternative method 3: *(Volume of 10 jugs) $10 \times \pi \times 5^2 \times 28$* *Answer in the range 21980 (cm^3) to 22000 (cm^3)* *or 7000π (cm^3)*	*M1* *A1*	 *May be implied in further working*
(Number of glasses not needed) *$10 \times \pi \times 5^2 \times 28 \div 170 - 80$*	*M1*	*(= 21980 ÷ 170 – 80 = 49.29...)* *FT 'their derived volume of 10 jugs' > 'their 170 × 80'*
(Number of jugs left over) *49.29... ÷ (2199.(...)÷170)* *or 49.29.... ÷ 12.9...*	*m1*	*(= 3.81...)* *FT 'their $10 \times \pi \times 5^2 \times 28 \div 170 - 80$'*
3 (full jugs left over)	*A1*	*Do not allow A1 from truncation of 12.9(...) to 12*

10(a) (Length^2 =) $4.2^2 + 1.1^2$	M1	Or alternative **full** method
Length^2 = 18.85 or (Length =) $\sqrt{18.85}$	A1	
(Length) 4.3(416…m)	A1	FT from M1, A0 for the correctly evaluated square root of 'their 18.85' provided 'their answer' > 4.2 (m) If 4.3(4...) not seen, this A1 may be implied by the sight of choice of panel 4.4(m) Do not accept an unsupported answer of 4.3 (m)
Selects 4.4 m length	A1	May be implied by use of £24 in further working FT where possible the length immediately > 'their 4.3416...' provided M1 previously awarded and 'their 4.3416...' has not been rounded down or truncated to give a different length from the table
(Number of panels needed is) 7 (panels)	B1	Allow B1 for 8 (panels) (thinking overlap may be as much as approximately ¼ of the width of a panel) Do not award B1 for 7 or 8 panels if incorrect logic from misinterpretation seen, e.g. working with area 26.05m^2 so buy 7 of the 4.1m panels with area 28.7m^2
(Cost of the shelter roof £24 × 7) (£) 168	B1	FT provided B1 previously awarded FT 'their derived 4.4' provided > 4.2 m 4.3 m | 23 × 7 | (£)161 4.5 m | 25 × 7 | (£)175 4.6 m | 26 × 7 | (£)182 Allow for 8 panels: 4.3 m | 23 × 8 | (£)184 **4.4 m** | 24 × 8 | **(£)192** 4.5 m | 25 × 8 | (£)200 4.6 m | 26 × 8 | (£)208

10(b) tan angle between roof and wall = $\frac{4.2}{1.1}$	M1	Or alternative **full** method
75.3(°)	A3	Ignore incorrect units Must be to 3 significant figures A2 for 75.32(3…°) or 75(°) OR A1 for $\tan^{-1}\frac{4.2}{1.1}$ From an alternative full method, award A2 maximum for 'their accurate answer' with errors due to rounding or truncation in stages of working, if the final answer is given correct to 3 significant figures, or A1 otherwise *Note:* *Use of tan angle between roof and wall = 1.1/4.2 is awarded M0 A0* *If no marks, award SC1 for 'their derived angle' given correctly to 3 significant figures* *($\tan^{-1}$ 1.1/4.2 = 14.7(°) to 3 significant figures)*