



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) <u>Alternative method:</u> 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 ($\pounds 238.68 + \pounds 122.76 + \pounds 49.95 - \pounds 234 - 120 - 45 =$) (£) 12.39	M2 A2 A1	Or equivalents M1 for any 1 or 2 correct methods A1 for any 1 or 2 correct evaluations (= $\pounds 411.39 - \pounds 399$) 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 = $360 \div 90 =$) 4 (Mass of sultanas = $360 \div 90 \times 50 =$) 200 (g)	M1 A1 B1 B1	Or 0.1875×1920 Do not accept from incorrect working FT 'their derived 360' $\div 90$, rounded or truncated to a whole number of eggs FT 'their derived 360' $\div 90$ or FT 'their 4' $\times 50$ provided 'their 4' $\neq 1$
3(b) $852 \times 2 \div 3$ 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(... m²) or 1.77 (m²) or 1.8 (m²) Rectangular table area 1.6 (m²) AND the conclusion 'no' (the circular table area is greater)	M1 A1 E1	Allow an answer truncated to 1.7(m²) 1.6 (m²) must be seen or implied by the difference between 1.6 (m²) and 'their area of circle' STRICT FT from 'their conclusion in (a)' for the conclusion in (b), provided M1 previously awarded in (b) <table border="1"> <thead> <tr> <th>Answers in (a)</th><th>Answers in (b)</th><th>Conclusion</th></tr> </thead> <tbody> <tr> <td>rectangle > circle</td><td>rectangle < circle</td><td>no</td></tr> <tr> <td>rectangle < circle</td><td>rectangle < circle</td><td>yes</td></tr> <tr> <td>rectangle > circle</td><td>rectangle > circle</td><td>yes</td></tr> <tr> <td>rectangle < circle</td><td>rectangle > circle</td><td>no</td></tr> </tbody> </table> <i>If they match it is 'yes', if they don't it is 'no'</i> <i>'Their conclusion' from (a) may be inferred</i> 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 $\frac{1}{2} \times \pi \times 1.5^2 = 3.5(...m^2)$ 2. Rectangular area 1.6 (m²) OR implied by the difference between 1.6 (m²) and 'their area of circle' 3. Appropriate conclusion of 'yes' or 'no'	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
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															
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) $2.5 \times £1.42$ or $£1.42 \times 250 \div 100$ • (Large bottle per 100 ml) $£3.65 \div 2.5$ or $£3.65 \times 100 \div 250$ • (Per 1000 ml) small $£1.42 \times 10$ AND large $£3.65 \times 4$ • (Per ml) small $£1.42 \div 100$ AND large $£3.65 \div 250$ • (Per 50 ml) small $£1.42 \div 2$ AND large $£3.65 \div 5$ • (ml per penny) $100 \div 142$ AND $250 \div 365$	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

8. (To spend on \$) OR (Convert to \$) $\begin{array}{l} 13/20 \times 500 \\ = (\text{£}) 325 \end{array} \quad \begin{array}{l} 500 \times 1.36 \\ = (\text{\$}) 680 \end{array}$ (Buying \$) $13/20 \times 500 \times 1.36$ (\$) 442 (As lowest note \$5 can only buy) (\$) 440 (This will cost) $440 \div 1.36$ or $13/20 \times 500 - (442 - 440) \div 1.36$ or $325 - 2 \div 1.36$ (£) 323.53 or (£)323.52(9...) (Money left to buy euros $500 - 323.53$) (£)176.47	M1 A1 M1 A1 B1 M1 A1 A1	May be embedded in further calculation FT 'their incorrectly evaluated $13/20 \times 500$' 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' FT 'their derived 442' and 'their derived 440' provided it is a multiple of 5 FT provided to the nearest penny Do not FT from incorrect rounding of 'their £323.52(9...)' Note: $500 - 323.52 = (\text{£})176.48$ is A0 <i>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</i>
8. <u>Alternative method:</u> (To spend on \$) OR (Convert to \$) $\begin{array}{l} 13/20 \times 500 \\ = (\text{£}) 325 \end{array} \quad \begin{array}{l} 500 \times 1.36 \\ = (\text{\$}) 680 \end{array}$ (Buying \$) $13/20 \times 500 \times 1.36$ (\$) 442 (As lowest note \$5 can only buy) (\$) 440 (\$2 is worth) $(442 - 440) \div 1.36$ or $2 \div 1.36$ (£) 1.47(05..) (Money left to buy euros $500 - 325 + 1.47$) (£)176.47	M1 A1 M1 A1 B1 M1 A1 A1	May be embedded in further calculation FT 'their incorrectly evaluated $13/20 \times 500$' 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 FT 'their derived 442' and 'their derived 440' provided it is a multiple of 5 FT provided to the nearest penny Do not FT from incorrect rounding of 'their £1.47(05...)' <i>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</i>

9. (Volume of a jug) $\pi \times 5^2 \times 28$ Answer in the range 2198 (cm³) to 2200 (cm³) or 700π (cm³) (Number of jugs needed) $170 \times 80 \div 2199(\dots)$ 6.1(84... jugs) or 6.2 (jugs) or 6 (jugs) 3 (full jugs left over)	M1 A1 M1 A1 A1	May be implied in further working FT 'their derived volume of a jug' provided > 'their $170 \times 80 \div 10$' FT 10 – 'their 6.18...' (depends on previous M1) <i>Note: For final M and A marks, allow if found from listing the capacity of a number of jugs</i>
9. <u>Alternative method 1:</u> (Volume of 10 jugs) $10 \times \pi \times 5^2 \times 28$ Answer in the range 21980 (cm³) to 22000 (cm³) or 7000π (cm³) (Volume left over = volume 10 jugs – 80 servings) = $10 \times \pi \times 5^2 \times 28 - 80 \times 170$ (Number of jugs left over) $8380 \div 2199(\dots)$ 3 (full jugs left over)	M1 A1 M1 m1 A1	May be implied in further working (= 21980 – 13600) FT 'their derived volume of 10 jugs' provided > 'their 170×80' <i>(Note: Correct answer is the range 8380 to 8394 cm³)</i> (= 3.81...) FT 'their derived volume of 10 jugs' provided > 'their 170×80' <i>Note: For final M and A marks, allow if found from listing the capacity of a number of jugs</i>
9. <u>Alternative method 2:</u> (Volume of a jug) $\pi \times 5^2 \times 28$ Answer in the range 2198 (cm³) to 2200 (cm³) or 700π (cm³) (Number of jugs left over) $10 - 80 \div (2199(\dots) \div 170)$ (= $10 - 80 \div 12.935\dots$) 3 (full jugs left over)	M1 A1 M2 A1	May be implied in further working FT 'their derived volume of a jug' provided > 'their $170 \times 80 \div 10$' M1 for sight of $80 \div (2199(\dots) \div 170)$ (=6.1(84...)) Do not allow A1 from truncation of 12.9(...) to 12
9. <u>Alternative method 3:</u> (Volume of 10 jugs) $10 \times \pi \times 5^2 \times 28$ Answer in the range 21980 (cm³) to 22000 (cm³) or 7000π (cm³) (Number of glasses not needed) $10 \times \pi \times 5^2 \times 28 \div 170 - 80$ (Number of jugs left over) $49.29\dots \div (2199(\dots) \div 170)$ or $49.29\dots \div 12.9\dots$ 3 (full jugs left over)	M1 A1 M1 m1 A1	May be implied in further working (= $21980 \div 170 - 80 = 49.29\dots$) FT 'their derived volume of 10 jugs' > 'their 170×80' (= 3.81...) FT 'their $10 \times \pi \times 5^2 \times 28 \div 170 - 80$' Do not allow A1 from truncation of 12.9(...) to 12

10(a) (Length² =) $4.2^2 + 1.1^2$ Length² = 18.85 or (Length =) $\sqrt{18.85}$ (Length) 4.3(416...m) Selects 4.4 m length (Number of panels needed is) 7 (panels) (Cost of the shelter roof £24 × 7) (£) 168	M1 A1 A1 A1 B1 B1	Or alternative full method 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) 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 Allow B1 for 8 (panels) (thinking overlap may be as much as approximately $\frac{1}{4}$ 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 FT provided B1 previously awarded FT 'their derived 4.4' provided > 4.2 m <table border="1" data-bbox="970 925 1334 1023"> <tr> <td>4.3 m</td><td>23 × 7</td><td>(£)161</td></tr> <tr> <td>4.5 m</td><td>25 × 7</td><td>(£)175</td></tr> <tr> <td>4.6 m</td><td>26 × 7</td><td>(£)182</td></tr> </table> Allow for 8 panels: <table border="1" data-bbox="970 1052 1334 1182"> <tr> <td>4.3 m</td><td>23 × 8</td><td>(£)184</td></tr> <tr> <td>4.4 m</td><td>24 × 8</td><td>(£)192</td></tr> <tr> <td>4.5 m</td><td>25 × 8</td><td>(£)200</td></tr> <tr> <td>4.6 m</td><td>26 × 8</td><td>(£)208</td></tr> </table>	4.3 m	23 × 7	(£)161	4.5 m	25 × 7	(£)175	4.6 m	26 × 7	(£)182	4.3 m	23 × 8	(£)184	4.4 m	24 × 8	(£)192	4.5 m	25 × 8	(£)200	4.6 m	26 × 8	(£)208
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4.6 m	26 × 8	(£)208																					

10(b) $\tan$ angle between roof and wall = $\frac{4.2}{1.1}$ 75.3(°)	M1 A3	Or alternative full method 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 <i>Note:</i> <i>Use of $\tan$ angle between roof and wall = 1.1/4.2 is awarded M0 A0</i> <i>If no marks, award SC1 for 'their derived angle' given correctly to 3 significant figures ($\tan^{-1} 1.1/4.2 = 14.7(^{\circ})$ to 3 significant figures)</i>
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