wjec cbac

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) Total charges	(£ 18) (£) 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 (\pounds) 136.08 in this box as implying (\pounds) 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	M2	Or equivalents
AND Gas interest 0.023 × 120		M1 for any 1 or 2 correct methods
AND Loan interest 0.11 × 45		
Weter (0) 4 00		
Vvater(t) 4.08	AZ	A1 for any 1 or 2 correct evaluations
Gas(t) 2.70		
Loan (L) 4.95		
Total interest (f) 12.39	Δ1	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:	M2	Or equivalents
Water payment 1.02 × 234		M1 for any 1 or 2 correct methods
AND Gas payment 1.023 × 120		,
AND Loan payment 1.11 × 45		
Water (£) 238.68	A2	A1 for any 1 or 2 correct evaluations
Gas (£) 122.76		
Loan (£) 49.95		
	A 1	(- 0444 20 - 0200)
1 otal interest (£238.68 + £122.76 + £49.95	AI	$(= \pm 411.39 - \pm 399)$
-£234 - 120 - 45 =)		F1 for the sum of 3 amounts $-(234 + 120 + 45)$
(£) 12.39		provided 2 of these 3 amounts are correct
Organisation and communication	001	For OC1 candidates will be expected to:
	001	• 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
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.
3(a) (Mass of sugar =) 1020 x 3 ÷ 16 or 3 × 1020	N/1	Or 0 1875 x 1920
18		
360 (a)	A1	
(Number of eggs = $360 \div 90 =$) 4	B1	Do not accept from incorrect working
, , ,		FT 'their derived 360' ÷ 90, rounded or truncated to a
		whole number of eggs
		-
(Mass of sultanas = 360 ÷ 90 × 50 =) 200 (g)	B1	FT 'their derived 360' ÷ 90 or FT 'their 4' × 50
		provided 'their 4' ≠ 1
	N 1 4	
(U) $OOZ \times Z = 3$ OF $Z \times OOZ$	INT.	
J 568 (a)	Δ1	Mark final answer
508 (g)		Allow M1 A0 for sight of 568(a) followed by additional
		working e a $852 - 568 = 284(a)$
	1	1

4(a) Perimeter (circumference of the circular table) $\pi \times 1.5$ or $2 \times \pi \times 0.75$ 4.7(m)	M1 A1	
Rectangular table perimeter 5.6 (m) AND the conclusion that rectangular perimeter is greater	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 $\pi \times (1.5 \div 2)^2$	M1	
1.76(m ²) or 1.77 (m ²) or 1.8 (m ²)	A1	Allow an answer truncated to 1.7(m ²)
Rectangular table area 1.6 (m ²) AND the conclusion 'no' (the circular table area is greater)	E1	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)Answers in (a)Answers in (b)Conclusion rectangle > circleImage: Answers in (c)rectangle > circleyesImage: Answers in (c)yesrectangle > circleImage:
5(a) 1000 × 250 ÷ 28350 or 250000 ÷ 28350 or 250 ÷ 28.35(0)	M2	M1 for sight of appropriate digits with division with incorrect place value of mass(es) Do not allow for division inverted
8.8(18) (applications)	A1	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 × 9 = 255(.)150 or 28(.)350 × 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 (m²). 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	M1	
	1.77(m)	A1	CAO. Ignore any units given
	(Area of skin) 1.9(m ²)	A1	CAO. Ignore any units given

7(a) 37 + 34 + 20 + 28 + 21	M1	 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
140 (students)	A1	Mark final answer
7(b) 5 to 10 seconds	B1	
7(c)		Allow if considering the 0.5(n+1)th term throughout
		FT 'their 140' provided 'their 140' > 100 throughout
10 (seconds) to 15 (seconds)	B2	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)	M1	FT 'their derived 140' from (a) provided >100 with numerator 37 or 'their 37' if seen in (a)
26(.42%) or 35 (students) AND ' No ' indicated	A1	Accept 0.26() only if 0.25 is seen

8. (16 spend on S) OK (Convert to S) 13/20 × 500 × 1.36 (S) 442 M1 May be embedded in further calculation (Buying \$) 13/20 × 500 × 1.36 (S) 440 M1 (A) M1 May be embedded in further calculation (A) (A) A) (A) (A) A) (A) (A) (A) (A) (A) (
1 $2(20 \times 800)$ 500 \times 1.36M1 (8) 425 M2(Buying \$) $13/20 \times 500 \times 1.36$ (\$) 442 M1 (\$) 442 FT their incorrectly evaluated $13/20 \times 500'$ (As lowest note \$5 can only buy)(\$) 440 M1 A1FT their derived $442'$ rounded down to the nearest multiple of 5(This will cost) 440×1.36 or $13/20 \times 500 - (442 - 440) \times 1.36$ or $325 - 2 \times 1.36$ M1 FT their derived $442'$ counded down to the nearest multiple of 5(Money left to buy euros $500 - 323.53$ (£) $1320 \times 500 - 323.52(9)$ A1(Money left to buy euros $500 - 323.53$ (£) 176.47 A1FT their derived $442'$ and their derived $440'$ provided it is a multiple of 5FT 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(Money left to buy euros $500 - 323.53$ (£) 176.47 (Buying \$) $13/20 \times 500 \times 1.36$ $= (2) 325 = -(3) 660M1A1(Buying $) 13/20 \times 500 \times 1.36= (2) 325 \times 1 - (3) 660M1A1(Buying $) 13/20 \times 500 \times 1.36= (2) 440M1($) 440(As lowest note $5 can only buy)($) 440B1A1Alternative method:(Buying $) 13/20 \times 500 \times 1.36= (2) 422 \times 1.36M1A1(Money left to buy euros 500 - 325 + 1.47)(£) 176.47(At low equivalent given unambiguously in possiblenotesFT their derived 442' and their derived 440' providedit is a multiple of 5(At low equivalent given unambiguously in possiblenotes(Buying $) 1.420 \times 500 \times 3.06A1(At lo$	8. (To spend on \$) OR (Convert to \$)		
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9. (Volume of a jug) $\pi \times 5^2 \times 28$ Answer in the range 2198 (cm ³) to 2200 (cm ³) or 700 π (cm ³)	M1 A1	May be implied in further working
(Number of jugs needed) 170 × 80 ÷ 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. <u>Alternative method 1</u> : (Volume of 10 jugs) 10 × π × 5 ² × 28 Answer in the range 21980 (cm ³) to 22000 (cm ³) or 7000 π (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 700 π (cm ³)	М1 А1	May be implied in further working
(Number of jugs left over) 10 – 80 ÷ (2199.() ÷ 170) (= 10 – 80 ÷ 12.935)	М2	<i>FT 'their derived volume of a jug' provided</i> > 'their 170 × 80' ÷10
(M1 for sight of
		80 ÷ (2199.() ÷ 170) (=6.1(84))
3 (full jugs left over)	A1	Do not allow A1 from truncation of 12.9() to 12
9. <u>Alternative method 3</u> : (Volume of 10 jugs) 10 × π × 5 ² × 28 Answer in the range 21980 (cm ³) to 22000 (cm ³) or 7000 π (cm ³)	M1 A1	May be implied in further working
(Number of glasses not needed) $10 \times \pi \times 5^2 \times 28 \div 170 - 80$	М1	(= 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(416m)	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 $\begin{array}{c ccccccccccccccccccccccccccccccccccc$

10(b) tan angle between roof and wall = 4.2	M1	Or alternative full method
1.1		
75.3(r) A3	Ignore incorrect units Must be to 3 significant figures A2 for 75.32(3°) or 75(°) OR A1 for tan ⁻¹ <u>4.2</u> 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)