GCSE MARKING SCHEME

SUMMER 2023

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

INTRODUCTION

This marking scheme was used by WJEC for the 2023 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

SUMMER 2023 MARK SCHEME

Unit *2*: Intermediate Tier	**Mark**	**Comments**
1(a) 59°F	B1	
1(b) (40°C is) 68 + 18 +18	M1	Accept an appropriate calculation that would lead to a correct answer of 104°F May be shown in stages Allow $\frac{9}{5} \times 40 + 32$ or $1.8 \times 40 + 32$ or $9 \times 8 + 32$ or $18 \times 4 + 32$ FT from (a) provided 'their 59' > 0, i.e. $59 + 2.5 \times 18$ or $59 + 45$ or equivalent
104 (°F)	A1	Answer space takes precedence
2(a)(i) 2¼ × 60 × 90 or 60 × 90 × 2 + 15 × 90 or 135 × 90 or 2¼ × 60 × 0.9(0) or 2¼ × 54 or equivalent	M2	May be seen in stages Must be an indication of a full and complete method that could lead to a correct answer Allow M2 if initially a correct method is seen but an incorrect interpretation of ¼ is seen in further working, e.g. as 0.15 or 25 minutes. Do **not** award M2 if the start of working contains an error, e.g. 2.15 × 60 × 90 (M1) or 120 × 90 with 25 × 90 (M1) M1 for any one of the following: • (2¼ × 60 = 120 + 15 =) 135 (minutes) • 'their time' × (0.)90, e.g. ○ 2 × (0.)90 (= 180 or 1.80) ○ 2¼ × (0.)90 (= 202.5 or 2.025) ○ 60 × (0.)90 (=£54 or 5400p / hour) ○ 120 × 90 (= 10800p for 2 hours) ○ 120 × 0.9(0) (= £108 for 2 hours)
(£) 121.5(0)	A1	CAO. Answer space takes precedence An answer of 12150(p) is M2 A0
2(a)(ii) 72(.00) ÷ 60 or 60 × 120 = 7200 or 60 × 1.2 = 72 or 6 × 12 = 72 or equivalent or 120(p) (per minute) or (£)1.2(0) (per minute)	M1	<u>Working **must** be shown to support choice of boxes</u> Allow M1 for Landline and C selected with working for Band A (£)18 or 1800(p) **and** Band B (£)36 or 3600(p)
Landline, Band C	A2	Both boxes must be indicated A1 for explicit sight of 120(p) or (£)1.2(0) (per minute) (not embedded) If no marks, award SC1 for boxes Landline **and** Band C indicated

2(b)(i) (Cost in pesos) 6 × 47.85 287.1 (pesos)	M1 A1	 Answer space takes precedence
2(b)(ii) (Cost in £) 2151.3(0) ÷ 143.42 (£) 15	M1 A1	 Answer space takes precedence, if blank may be implied in further working Allow from a trial and improvement method
(Length of call) 15 ÷ (0.)3(0) or 1500 ÷ 30 or 50 × (0.)30 = 15(.)00 or equivalent	m1	Allow a place value error in intended division, e.g. 15 ÷ 3 FT 'their 2151.3(0) ÷ 143.42'
50 (minutes)	A1	CAO with no incorrect working seen Answer space takes precedence If answers are reversed ((£)50 and 15 (minutes)), award M1 A0 m1 A1 (not from incorrect working)
3(a) <u>Gwesty Arwel (costs are)</u> (1 night: 12 single rooms and 18 twin rooms) (84 × 12 and 102 × 36 ÷ 2) (£)1008 <u>and</u> (£)1836 OR (£)2844 OR (3 nights 12 single rooms and 18 twin rooms) (3 × 84 × 12 and 3 × 102 × 36 ÷ 2) (£)3024 <u>and</u> (£)5508 OR (£)8532	B2	B2 or B1 may be seen or implied in further working B1 for any one of the following: • (12 single rooms for 1 night) (£)1008 • (18 twin rooms for 1 night) (£)1836 • (12 single rooms for 3 nights) (£)3024 • (18 twin rooms for 3 nights) (£)5508
(Total discounted cost for 3 nights) 84 × 12 + 102 × 36 ÷ 2 × 3 × (1 – 0.14)	 M1 M1	For both M marks, awarded in either order, FT 'their cost of single rooms + twin rooms' Calculations may be shown separately as single rooms and twin rooms, but must include intention to add costs in further working
(£) 7337.52	A1	CAO If M1 M0 A0, award SC1 for (£)1194.48 or correctly evaluated total discount for 'their **3** nights'
<u>Hotel Glan y Môr (costs for 5 nights are)</u> 12 × 58 + 36 × 34 (× 5) or (696 + 1224) (× 5) or 1920 (× 5) or 3480 + 6120	M1	A single night calculation may be embedded in a calculation for a number of nights other than 5 or 2 different numbers provided not '× a' for single and '× 2a' for the twin rooms
(£) 9600	A1	CAO
(<u>Total cost of the 8 nights</u> is 7337.52 + 9600 =) (£) 16937.52	B1	FT adding 'their derived perceived final costs' provided at least 4 marks previously awarded
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 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(b) (Number of litres of fuel) (33860 – 32474) ÷ 4 = 346.5 (litres)	M2 A1	M1 for (km travelled) 33860 – 32474 (= 1386) Allow rounded to 347 or truncated to 346, provided not from incorrect working, including from trial and improvement, May be implied in later work If M0 A0, award SC1 for any one of the following: • (33860 ÷ 4 =) 8465 • (32474 ÷ 4 =) 8118.5 • ((33860 + 32474) ÷ 4 = 66334 ÷ 4 =) 16583.5
(Cost of fuel) 346.5 × 1(.)86 (£)644.49 or 64449(p)	M1 A1	FT 'their number of litres of fuel' CAO. If units are given, they must be correct
3(b) Alternative method: *(Fuel cost per km) 1(.)86 ÷ 4* *= 46.5 (p/km) or 0.465 (£/km)* *(Distance travelled 33860 – 32474 =) 1386 (km)* *(Cost of fuel) 1386 × 0.465 or 1386 × 46.5* *(£)644.49 or 64449(p)*	*M1* *A1* *B1* *M1* *A1*	*Allow rounded to (0.)47 or truncated to (0.)46* *FT 1386 × 'their derived 46.5' or* *1386 × 'their derived 0.465'* *OR* *FT 'their 1386' × 'their 1(.)86 ÷ 4', including use of 33860, 32474 and 33860 + 32474* *CAO. If units are given, they must be correct*
4(a) (700 × 100 ÷ 2.5) ÷12 or 700 ÷ 0.3(0) or 70000 ÷ 30 or equivalent 2333(.3.... feet) or 2333(feet 4 inches)	M2 A1	Must be using given conversions May be seen in stages M1 for any one of the following: • Sight of 1 foot (12 inches) as 30(cm) • Intention of (70000 ÷ 2.5) *** • Sight of digits 233(33…) *** • Intention (700 ÷ 2.5) ÷ 12*** • Sight of 28000 (inches) *** Allow with incorrect place value, due to incorrect or no conversion, but division has been implied CAO. Ignore if an incorrect unit is given

4(b) 1.34 × 8 ÷ 5 or × 1.6 (to convert miles to km) × 1000 (to convert km to m) ÷ 84 (to find number of minutes) (Time correct to the nearest minute) 2(:) 26 p.m. or 14(:)26	M1 M1 M1 A2	May be seen in any order Allow × 1.61 or × 1.609 Do not accept × 1.5 (= 2144 m) Accept embedded '× 1000', e.g. sight of 1340, (1.34 × 1200 =) 1608, (1.34 × 1500 =) 2010 (i.e. × 1500 is awarded M0 M1) (= 25.52…minutes) (Note: sight of ÷ 0.084 is equivalent to × 1000 (M1) and ÷ 84 (M1)) Ignore further incorrect stages of working, provided they do not involve multiplication or division by 1.6, 1000 or 84 CAO. Answer space takes precedence A2 awarded only if there is no incorrect working Depends on M1 M1 M1 previously awarded, for rounding time to nearest minute and adding to 2 p.m. Allow 2.26 p.m. or 14.26(p.m.) Award A1 for any one of the following: • 2(:) 25(.5...) p.m. or 14(:)25(5...) • 2(:)26 or 2(:)26 a.m. or 02(:)26 or 02(:)26 p.m. • 26 (minutes) • FT from M2 (or M3) for 'their correctly rounded time to the nearest minute' added to 2 p.m. expressed with p.m. or correct 24-hr notation, provided 1 < 'their whole number of minutes' < 60 • FT from M0 M1 M1 o for use of ×1500m to give 2(:)24 p.m. or 14(:)24 o for 1.34 × 1000 ÷ 84 = 15.952…to give 2(:)16 p.m. or 14(:)16 ** ** 84 × 16 = 1344 is awarded M0 M1 M1, with possible FT A1 for 2(:)16 p.m. or 14(:)16)
4(b) <u>Alternative method:</u> *84* *÷ 1.6* *÷ 1000* *1.34 ÷ (84 ÷ 1.6 ÷ 1000) (time taken)* *(Time correct to the nearest minute)* *2(:) 26 p.m. or 14(:)26*	 *M1* *M1* *M1* *A2*	*Initial 2 method marks may be in either order* *Or ÷ 1.61 or ÷ 1.609* *÷ 1500 is M0 M1* *CAO. Answer space takes precedence* *A2 awarded only if there is no incorrect working* *Depends on M1 M1 M1 previously awarded, for rounding time to nearest minute and adding to 2 p.m.* *Allow 2.26 p.m. or 14.26(p.m.)* *A1 as shown above* *FT from M0 M1 M1 and M2 as shown above*
5(a) (Girls) 4 + 18 + 10 + 5 AND (Boys) 3 + 20 + 11 + 4 'Correct' indicated or implied AND number of girls 37 AND number of boys 38	M2 A1	For M2 allow **an error** in 1 of the 8 values M1 for either (Girls) 4 + 18 + 10 + 5 (=37) or (Boys) 3 + 20 + 11 + 4 (=38) CAO

5(b)		FT 'their first values' and 'their 'totals' from (a) If their number of girls = their number of boys then FT for possible first M1 A1 only
(Girls) $\frac{4}{37}$ (× 100) **OR** (Boys) $\frac{3}{38}$ (× 100)	M1	Do not accept '4 out of 37' or '3 out of 38'
10.8(….%) or 11(%) **AND** 7.8(9…%) or 7.9 (%) or 8(%)	A2	Do not award A2 or A1 from incorrect working seen Allow A2 as implied by a final answer in the range 2.8(%) to 3.2(%) from the sight of the appropriate decimals if individual percentages are not seen A1 for any one of the following: • (Girls) 10.8(….%) or 11(%) • (Boys) 7.8(9…%) or 7.9 (%) or 8(%) • (Girls) 0.108… **and** (Boys) 0.078…
Difference 2.9(%)	A1	Only FT from A2 previously awarded Answer space takes precedence Must be given as a percentage to 1 decimal place Do not FT from premature approximation If no marks, from appropriate working award SC1 for working with any one of the following: • (first and last 10 seconds) 9/37 and 7/38 • (last 10 seconds) 5/37 and 4/38 or equivalents as decimals or percentages **OR** SC2 for the respective answers: • (24.3(2…) – 18.4(2...)) 5.9(%) • (13.5(1…) –10.5(2…) = 2.99 =) 3.0 (%)
6a(i) (Median group) 166 ≤ *h* < 174	B1	Accept '166 to 174' or '166 – 174' or 'third group' or 'group 3' or similar Do not accept 9 or 14 or 170
Reason, e.g. '14th height'	E1	Depends on B1 previously awarded or previous B0 was due to giving the answer '9','14' or '170' E1 for clear indication that median height is the 14th Allow, e.g. sight of 14, 'middle person', 'middle height', 'by counting the frequencies, ½ the people are taller', 'half the people are taller', '13.5(th) (musician)', 'total of 27 (people), the middle of that is in the group' Do not accept, e.g. 'middle group', 'in the middle', 'middle', 'middle number', 'groups are not specific', 'because the median (height) is 174'

6(a)(ii) Indicates unambiguously 'No' with a valid reason, such as 'only know the group' 'it doesn't show raw data' 'the actual heights are not given', 'the 3 people could be anywhere in the group 150cm to (less than) 158cm', 'no way of knowing individual heights'	E1	Ignore spurious additional comments Allow 'No' with, e.g. 'don't know the height of these 3 people ', 'all 3 people could all be 155cm tall', 'everyone in group 150cm to 158cm could be 157cm', 'could all be taller than 154(cm)', '3 of them from 150 to 158 but not certain of height', 'we only know they are between 150 and 158', 'of the 3 people there may be, (but it is not certain)', '(data is) not specific', 'little chance as there are only 3 people in the group', 'the groups are not that specific', 'it's not specific enough', 'there is a possibility that there is one person shorter than 154cm as the midpoint is 154cm' Do not accept, e.g. 'everyone in the group 150cm to 158cm could be 158cm tall'
6(b) Midpoints 154, 162, 170, 178, (186,) 194 154×3 + 162×10 + 170×9 + 178×4 (+186×0) + 194×1 (= 462 + 1620 + 1530 + 712 + 0 + 194 = 4518) ÷ 27 167(.333.... cm) or equivalent	B1 M1 m1 A1	 186×0 may not be seen FT 'their midpoints' or at the bounds of the appropriate groups, provided no more than one of 'their midpoints' lies outside the group ISW Treat an error of e.g. 186 × 0 written as 186, leading to total 4704, 4704 ÷ 27 = 174(.222….) as follows: B1 M1 m1 possible but A0 or equivalents on FT
7. 1800×1.02^{28} 3133 (steps) or 3134 (steps)	M2 A2	M1 for any one of the following: • sight of 1800 × 1.02 • (1800 × 1.02 =) 1836 • from non-compound: ○ (1800 + 36 × 28 =)1800 + 1008 ○ (28 × 2% = 56% so) 1.56 × 1800 ○ a final answer of 2808 CAO A1 for 3133.8(... steps) If no marks, award SC1 for 1800×1.02^{27} or 1800×1.02^{29} or 3072.3(9…) or 3196.5(2…) **OR** SC2 for 3072 or 3073 (steps) or 3196 or 3197 (steps) respectively
8(a) A1	B1	

8(b) 59.4 × 42(.0) ÷ (100 × 100) or 0.594 × 0.42	M2	For a product using the correct place value in the conversion of units (= 0.249(48 m^2) or 0.25 (m^2)) Do not accept use of 59 instead of 59.4 for M2 M1 for a calculation including the product of digits 59(.4) and 42(.0), which may include error(s) due to place value
× 120	m1	FT from M2 or M1
29.9376(g) or 29.94(g) or an answer in the range 29.8 (g) to 30 (g)	A1	CAO. Statement answer space takes precedence If incorrect size of paper selected, award SC2 for the following answers, allow suitable rounding, or truncation at 1 or more decimal place(s): A0* | A1 | A3 | A4 119.993..(g)* | 59.946…(g) | 14.9688(g) | 7.4844(g) *Paper size A0 appropriate working or 119.9(…) **must** be seen OR Award SC1 for the appropriate digits with a place value error
8(c) (Diagonal $A4^2$ =) $21^2 + 29.7^2$	M1	May be shown in further working
Diagonal^2 = 1323.09 or (Diagonal =) √1323.09	A1	
(Diagonal A4 =) 36 (cm) or 36.3(7... cm) or 36.4 (cm)	A1	FT from M1 for the correctly evaluated square root of 'their 1323.09' provided 'their answer' > 29.7 (cm) Must be from correct working
(Diagonal A5) 36.37... × 21(.0) ÷ 29.7 or 36.37... × 0.7(0....) or 36.37... ÷ (29.7 ÷ 21(.0)) or 36.37… ÷ 1.4(1…)	M1	FT 'their derived diagonal' or 'their stated diagonal' provided ≠ 21 or ≠ 29.7
Answer in the range 25.2 (cm) to 26(cm)	A1	Answer must be from correct working.
8(c) <u>Alternative method</u>: *(Side of A5) 21(.0) × 21(.0) ÷ 29.7* *or 21 × 0.7(0...)* *or 21 ÷ 1.4(1...)* *or 29.7 ÷ 2*	*M1*	*May be shown in further working*
Answer in the range 14.7 (cm) to 15(cm)	*A1*	*Must be from correct working*
(Diagonal $A5^2$ =) $21(.0)^2 + 14.848...^2$	*M1*	*FT 'their derived side of A5' or 'their stated side of A5' provided ≠ 21 or ≠ 29.7*
Diagonal^2 = 661.4775.... or (Diagonal =) √661.4775...	*A1*	
(Diagonal A5) Answer in the range 25.2 (cm) to 26(cm)	*A1*	*Answer must be from correct working.* *FT from M1 for the correctly evaluated square root of 'their 661.4775...' provided 'their answer' > 21 (cm)*

8(d) Sight of 84.15(cm) or 841.5(mm) **and** 59.45 (cm) or 594.5(mm) or equivalents in m	B1	<u>Penalise incorrect unit -1 once (withhold B or A mark)</u> Award B1 for sight of 4 × 0.05 in an appropriate calculation Allow 0.04999(....) for 0.05, must clearly be a recurring 9 digit
2 × (84.15 + 59.45) or 2 × (84.1 + 59.4) + 4 × 0.05 or equivalent	M1	Or equivalent in mm or m If B0, FT provided unambiguously chosen: 84.1 < 'their 84.15' ≤ 84.2 and 59.4 < 'their 59.45' ≤ 59.5
2872 (mm) or 287.2 (cm) or 2.872 (m)	A1	CAO. Allow 287.1999 (cm) or equivalent (Note: Not using bounds leads to an incorrect answer of 287cm B0 M0 A0) If incorrect size of paper selected, award SC1 for the following answers, or equivalents: A0: 406.2 (cm) | A2: 203 (cm) | A3: 143.6 (cm) | A4: 101.6 (cm)
9. (Length of the package, x + y) (x =) 17.5 × cos34° or (x =) 17.5 × sin56° AND (y =) 11.1 × cos56° or (y =) 11.1. × sin34°	M3	Or alternative full method M2 for any 1 of these statements correct or as appropriate from an alternative method OR M1 for .../17.5 = cos34° or .../17.5 = sin56°, or .../11.1 = cos56° or .../11.1 = sin34°
Sight of 14.5(08... cm) and 6.2(07.... cm) or for the sum of these: 20.7(… cm) or 21 (cm)	A2	<u>Must be from correct working (not from $11.1^2 + 17.5^2$)</u> A1 for 14.5(08... cm) or 6.2(07.... cm)
(Volume =) 19 × 6.7 × (14.5(08...) + 6.2(07....)) or 19 × 6.7 × 20.7 or 19 × 6.7 × 21	M1	FT 'their x + y' provided some use of trigonometry attempted previously (including incorrect use) and both x > 0 and y > 0. Award M1 for an unsupported correct volume, or 'their FT volume' provided FT criteria met
Answer in the range 2635 (cm^3) to 2673.5 (cm^3) AND Cost (£)14.85	A1	Answer space takes precedence FT from truncation or rounding FT for appropriate cost for 'their volume' provided it is ≤10 000 (cm^3) FT is 127.3 × 'their x + their y' correctly evaluated If 'y' not considered, possible M2, A1 then also award SC1 for a volume of 1845 (cm^3) to 1847.2 (cm^3) AND cost (£)13.6(0) If 'x' not considered, possible M2, A1 then also award SC1 for a volume of 789 (cm^3) to 790.6 (cm^3) AND cost (£)12.55 If no marks, award SC1 for an answer in the range 2635 (cm^3) to 2673.5 (cm^3) AND Cost (£)14.85 from use of 20.7…(cm) from $\sqrt{(11.1^2 + 17.5^2)}$

10. (Surface area) π × 0.18 × 2.5 or equivalent	M2	<u>Accept equivalents in cm throughout</u> Must be the complete method M1 for any one of the following provided it is not embedded in further incorrect working: • π × 0.18 (= 0.565... m) • π × 18 cm (= 56.5... cm) • π × 18 cm × 2.5 (m) • π × 0.18 × 250 cm • ** π × 0.18 × 2.5 + (2 ×) π × 0.09^2 or equivalent Allow M1 for any one of the following provided it is not embedded in further incorrect working: • π × 2 × 0.18 × 2.5 or π × 0.36 × 2.5 (= 2.827…) • π × $\frac{0.18}{2}$ × 2.5 or π × 0.09 × 2.5 (= 0.706…) or equivalent
1.41 (m^2) or 14100 cm^2	A2	Mark final answer. Must be correct to 3 significant figures. A1 for any one of the following: • 1.4(13... m^2), correct but not to 3 sig. figs. • 1.4(... m^2) from premature approximation • ** 1.44 (m^2), from including 1 end • ** 1.46 (m^2), from including 2 ends **No other FT allowed from M1