GCSE MARKING SCHEME

SUMMER 2024

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

About this marking scheme

The purpose of this marking scheme is to provide teachers, learners, and other interested parties, with an understanding of the assessment criteria used to assess this specific assessment.

This marking scheme reflects the criteria by which this assessment was marked in a live series and was finalised following detailed discussion at an examiners' conference. A team of qualified examiners were trained specifically in the application of this marking scheme. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners. It may not be possible, or appropriate, to capture every variation that a candidate may present in their responses within this marking scheme. However, during the training conference, examiners were guided in using their professional judgement to credit alternative valid responses as instructed by the document, and through reviewing exemplar responses.

Without the benefit of participation in the examiners' conference, teachers, learners and other users, may have different views on certain matters of detail or interpretation. Therefore, it is strongly recommended that this marking scheme is used alongside other guidance, such as published exemplar materials or Guidance for Teaching. This marking scheme is final and will not be changed, unless in the event that a clear error is identified, as it reflects the criteria used to assess candidate responses during the live series.

WJEC GCSE MATHEMATICS - NUMERACY

SUMMER 2024 MARKING SCHEME

Unit 2: Intermediate Tier	Mark	Comments
1. (Amount needed to save after next week) (£)510 – 165 or (£) 510 – (95 + 70) or (£) 510 – 95 – 70 (=£345)	M2	May be seen in stages Allow missing brackets provided not contradicted in further working M1 for sight of any one of • 510 – 95 (= £415) • 510 – 70 (= £440)
(Amount to save per week £) ÷ 12	m1	Depends on at least M1 previously awarded
(£) 28.75	A1	CAO. ISW FT provided at least 2 marks previously awarded • FT from M1 m1 for A1: ○ 415 ÷ 12 = (£)34.58(333…) or (£)34.59 ○ 440 ÷ 12 = (£)36.66(666..) or (£)36.67 • FT from M2 m0 for A1: ○ 345 ÷ 13 = (£)26.53(8….) or (£)26.54 ○ 345 ÷ 11 = (£)31.36(36…) or (£)31.37 If no marks, award any one of the following: SC2: (£)28.75 < answer ≤ (£)29, from supporting working, e.g. 12 × 29 + 95 + 70 = (£)513 SC1: (£)28.75 < unsupported answer ≤ (£)29 SC1: answer (£)13.75 from 165 ÷ 12 SC1: answer (£)42.50 from 510 ÷ 12
2(a)(i) 133 × 8 1064 (miles)	M1 A1	Mark final answer. Allow 1064 km
2(a)(ii) 8 × 60 480 (mph)	M1 A1	FT from (a)(i) 60 × 'their 1064' ÷ 133 or 'their 1064' ÷ $\frac{133}{60}$ or 'their 1064' ÷ 2.2(166…) Allow A1 for 479 (mph) < answer ≤ 483.64 (mph) from 1064 ÷ 2.2(1666…) rounded or truncated to at least 1 d.p. or similar for a correctly evaluated 'their 1064' ÷ 2.2(166..)
2(b) 55 × 40 × 23 50 600 (cm^3) or 50 600 ml or 50.6 litres Unambiguously implies 'Yes' with one of the following: • (48 litres =) 48 000 cm^3 • 50.6 (litres) • a suitable appropriate statement, e.g. '50 litres is more than 48 litres'	M1 A1 E1	FT from M1 A0 provided appropriate conclusion and conversion is shown Allow 'Yes' with clear **use of** 1 litre = 1000 cm^3, e.g. • (48 litres is less than) 50(.6 litres) • 50(.6 litres is greater than 48 litres) • 50 000 (cm^3) is greater than 48 000 (cm^3)

Unit 2: Intermediate Tier	Mark	Comments
2(c) a = 43(°)	B1	
b = 137(°)	B1	FT b = 180 - 'their a', provided 'their b' > 90 and 'their b' ≠ 112
c = 112(°)	B1	FT 360 – (68 + 'their a' + 'their b'), provided: • 112 < 'their a' + 'their b' < 202 • c ≠ 137 • their c' ≠ 'their b'
d = 112(°)	B1	FT d = 'their c', provided 90 < 'their c' < 180

3. *Select the method to give the best mark:*

	Method **using £**		**OR**	Method **using $**
Camera Fox	(62.95 + 3.90 =) (£)66.85	B1		(62.95 + 3.90) × 1.25 or (£)66.85 × 1.25 or 62.95 × 1.25 + 3.90 × 1.25 M1 ($)83.56(25) or (78.69 + 4.88 = $)83.57 *Allow an answer in the range ($) 83.55 to ($)83.57* A1
US Camera Geek	81.20 ÷ 1.25 M1 (£)64.96 A1			($81.20 given)
Sure Camera	75 – 75 × 0.14 or 75 – 10.50 or 75 × (1 – 0.14) M1 (£)64.50 A1			(75 – 75 × 0.14) × 1.25 or 64.50 × 1.25 or 75 × (1 – 0.14) × 1.25 M2 ($)80.62(5) or ($)80.63 A1
Conclusion 'Sure Camera'	Costs 66.85, 64.96 and 64.50 WITH incorrect conclusion or no conclusion penalise -1			Costs in dollars correct WITH incorrect conclusion or no conclusion penalise -1

OR method **using £ and $**

	£			$
Camera Fox	(62.95 + 3.90 =) (£)66.85	B1		
US Camera Geek				($81.20 given)
Sure Camera	*75 – 75 × 0.14* *M1* *(£)64.50* *A1*		***or***	(75 – 75 × 0.14) × 1.25 M2 ($)80.62(5) or ($)80.63 A1
Conclusion	Costs (£)66.85 with (£)64.50 and ($)80.62(5) (or ($)80.63) AND conclusion 'Sure Camera' A1			

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.

Unit 2: Intermediate Tier	Mark	Comments
4.		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6 (Cost of gas = Number of kWh) × 0(.)12	M1 m1	(= 1548.4474 kWh)
(£)185.76 to (£)185.82 or 18576(p) to 18582(p)	A1	(1548.4474 × 0.12 = £185.813688)
(Standing charge 30 × (0.)32 =) (£)9.6(0) or 960(p)	B1	CAO
(Total of gas and standing charge) *(£)195.36 to (£)195.42 or 19536(p) to 19542(p)	B1	FT 'their derived cost of gas' + 'their 30 × (0.)32' correctly evaluated, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh May be implied in later working
(Total including VAT =) 1.05 × 195(.)36 to 1.05 × 195(.)42	M1	FT 'their derived total cost of gas + 'their standing charge'
*(£)205.12 to (£)205.19(1) or 20512(p) to 20519(.1p)	A1	ISW further rounding, e.g. (£)205, (£)205.20 If final B0 B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas' having omitted the standing charge, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh **Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*
4. Alternative method: Gas per day		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6 *(Number of kWh per day) ÷ 30* *(Cost of gas per day) × 0(.)12*	*M1* *m1* *m1*	*(= 1548.4474 kWh)* *(= 51.6149133…kWh)*
(Cost of gas per day =) (£)6.19(…) or 619(...p)	*A1*	*CAO*
(Total of gas and standing charge) *6.51(…) or 651.(…p)*	*B1*	*FT 'their derived cost of gas per day' + (0.)32 correctly evaluated* *May be implied in later working*
(Total including VAT =) *1.05 × 6.51(…) × 30*	*M1*	*(= 6.83(94…) × 30 or 6.84 × 30)* *FT 'their derived cost of gas per day + (0.)32, provided 'their derived cost of gas'* *≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6'* *or 1548.4474 kWh*
**(£)205.12 to (£)205.19(1)* *or 20512(p) to 20519(.1p)*	*A1*	*ISW further rounding, e.g. (£)205, (£)205.20* *If final B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas per day' × 30 having omitted the standing charge,* provided 'their cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh **Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*

Unit 2: Intermediate Tier	Mark	Comments
5(a) $\frac{247}{400}$	B2	Mark final answer B1 for sight of $\frac{988}{1600}$ or $\frac{494}{800}$ If no marks, award SC1 for a final answer of $\frac{153}{400}$
5(b) 18000 × 8 ÷ 5 or 18000 × 1.6 or equivalent 28 800 (km)	M1 A1	Accept use of × 1.6 to × 1.613 or ÷ 0.62 to ÷ 0.625 Also accept answers in the range 28960 (km) to 28980 (km)
5(c) (Cost of tarmac) 1600 × 23 × 0.035 × 250 (£) 322 000	M2 A1	M1 for a product including any 3 of these 4 values Allow M1 for • (1600 × 0.035 × 250 =) 14 000 • (1600 × 23 × 250 =) 9 200 000 • (1600 × 23 × 0.035 =) 1288 • (23 × 0.035 × 250 =) 201.25 CAO If no marks, award SC1 for an unsupported answer with leading digits 322 and all other digits zero e.g. 32 200 or 3 220 000 If no marks, award either • SC2 for (988 × 23 × 0.035 × 250 =) (£)198 835 or • SC1 for (988 × 23 × 0.035 =) 795(.34 m^3)
5(d) (2009 to 2014) (100 ×) $\frac{6.40-5.40}{5.40}$ or $\frac{1}{5.40}$ or $\frac{6.40}{5.40}$ (- 1) (2004 to 2009) (100 ×) $\frac{5.40-4.60}{4.60}$ or $\frac{0.80}{4.60}$ or $\frac{5.40}{4.60}$ (- 1) Choice of '2009 to 2014' **AND** 18.5(.... %) or 19(%) **AND** sight of 17(.39...%) or 17.3 (%) or 17.4 (%) or 1.17(...) or 117.(…) or 0.17(...) (for 2004 to 2009)	 M1 M1 A2	Ignore any working for '2014 to 2019' Accept working in £ or p consistently Answer space takes precedence Allow percentage increase given as 18(%) Award M mark as well as A mark for a correct percentage from a 'reverse percentage method' A1 for sight of any of the following: • (2009 to 2014) 18(%), 18.5(.... %) or 19(%) • (2004 to 2009) 17(.39...%) or 17.3(%) or 17.4 (%) • 1.18(5...) or 1.19 **and** 1.17(...) • 118(.5...) or 119 **and** 117.(...) • 0.18(5...) or 0.19 **and** 0.17(...) *Alternative second stage method:* *If M1 A1 awarded for 2004 to 2009, also award M1 for (2009 2014) 1.1739 × 5.40 = (£)6.339 (< 6.40)* *If M1 A1 awarded for 2009 to 2014, also award M1 for (2004 2009) 1.185... × 4.60 = 5.451(8…) (>5.40), with A1 for 18.5…(%) given on the answer line*

Unit 2: Intermediate Tier	Mark	Comments
6(a)(i) 18 to 24 hours	B1	
6(a)(ii) 97	B1	
6(a)(iii) 13	B1	
6(a)(iv) States or unambiguously implies 'No' with a reason, e.g. 'no people in group 0 to 6 hours'	E1	Allow 'No' with e.g. 'the point before 6 hours is at zero' Do not allow 'Can't tell' with e.g. 'it is grouped data' Do not accept "No' with e.g. 'it is grouped data' (unless explaining why) 'there is no point at 6' '6 hours has a frequency of 0' 'it does not match a group of people' 'the first point is at 0 and the second one is at 20' 'the first plot is at 20' 'the first plot is at 9 hours' 'the first plot above 0 is at 9 hours' 'there is no information at 6 hours, it starts at 9 hours' 'the shortest time is 9 hours'
6(b) Sight of 22.5, 25.5, 29.5 and 31.5 (mm) 22.5 + 25.5 + 29.5 + 31.5 or 22+25+29+31 + 4 × 0.5 or equivalent 109 (mm)	B1 M1 A1	Award B1 for sight of 4 × 0.5 in an appropriate calculation Allow 0.4999(….) for 0.5, must clearly be a recurring 9 digit If B0, FT provided unambiguously chosen: 22 < 'their 22.5' ≤ 23, 25 < 'their 25.5' ≤ 26, 29 < 'their 29.5' ≤ 30, and 31 < 'their 31.5' ≤ 32, CAO. Ignore incorrect units given Ignore any working for least possible thickness also given, e.g. 21.5 + 22.5 + 28.5 + 30.5 = 105

Unit 2: Intermediate Tier	Mark	Comments
7(a) Method **not directly** working with a stated or omitted number of hours difference		Methods may be shown in stages or be embedded Use this method if 2 separate numbers of hours are used, which may not be correct, i.e. ≠12 and ≠10, with or without indication of subtraction Penalise every additional **spurious** term by reducing the count of correct terms by 1*
0.324 × 8 × **(10 or 12)** × 7 × 80 ÷ 1000	M3	Allow '× 32.4' for '× 0.324' M2 for any 4 or 5 correct terms* M1 for any 3 correct terms*
0.324 × 8 × **(12 or 10)** × 7 × 80 ÷ 1000 **with** the intention to subtract	m1	Must be an indication of the intention to subtract, in either order **FT from 5 (or 6) consistent correct terms** for use of • the other value 10 or 12 respectively • 'their number of hours' are 13 **and** 11 (incorrect) Award m0 if inconsistent, i.e. not an equal number of **consistent correct terms*** between the expressions. Mark 'their better stated calculation' first if both are given
(Saving is 17.418… – 14.515…=) (£) 2.90	A1	CAO All working must be checked, do not award 5 marks for £2.90 from incorrect working.
Alternative method: *Method **directly** working with a stated or omitted number of hours difference*		*Methods may be shown in stages or be embedded* *Use this method if a single number of hours is used, which may not be correct, i.e. ≠2, or if the number of hours is omitted* *Do not allow 2 hours as a correct term from incorrect working, e.g. 13 – 11 = 2* *Penalise every additional **spurious** term by reducing the count of correct terms by 1**</td>
0.324 × 8 × 2 × 7 × 80 ÷ 1000	*M4*	*Allow '× 32.4' for '× 0.324'* *M3 for any 5 correct terms** *M2 for any 4 correct terms** *M1 for any 3 correct terms**
(Saving is) *(£) 2.90*	*A1*	*CAO* *All working must be checked, do not award 5 marks for £2.90 from incorrect working.*

Unit 2: Intermediate Tier	Mark	Comments
7(b) Height = $\tan 68° \times 3.3$ or height = $\frac{\sin 68° \times 3.3}{\sin(90 - 68)°}$	M2	Or alternative correct full method, isolating height M1 for $\tan 68° = \text{height} / 3.3$ or $\frac{\text{height}}{\sin 68°} = \frac{3.3}{\sin(90 - 68)°}$ or equivalent
8.167… (m) or 8.17 (m) or 8.2 (m)	A1	Allow 8(m), 8.1(m) 8.16(m) from correct working
8(a) Midpoints 1, 4, 7, 11, 16	B1	
$1 \times 8 + 4 \times 12 + 7 \times 20 + 11 \times 4 + 16 \times 6$ $(= 8 + 48 + 140 + 44 + 96)$ $(= 336)$	M1	FT 'their midpoints' provided at least 4 lie within the appropriate group, including bounds throughout Use of lower bounds gives 276 Use of upper bounds gives 396
$\div 50$	m1	
6.72 or 6.7 (walks)	A1	Allow rounded to 7 (walks) from appropriate working Use of lower bounds gives 5.5(2 walks) or 6 (walks) Use of upper bounds gives 7.9(2 walks) or 8 (walks)
8(b) 06(:)53 or 6(:)53 a.m.	B1	Allow 06(:)53 a.m. or 6(:)53 Do not accept (0)6(:)53 p.m.

Unit 2: Intermediate Tier	Mark	Comments
8(c) $(\text{Height})^2 = 7.6^2 - (18.8 - 12.6)^2$ or $(\text{Height})^2 = 7.6^2 - 6.2^2$ or $\cos^{-1}(\frac{18.8-12.6}{7.6}) = 35(.3345\ldots)°$ and $\sin 35(.33\ldots)° = \frac{\text{Height}}{7.6}$ or $\tan 35(.33\ldots)° = \frac{\text{Height}}{6.2}$	M2	M1 for sight of 18.8 – 12.6 with • any attempt to use Pythagoras' Theorem (including summing rather than subtraction) • $\cos^{-1}(\frac{18.8-12.6}{7.6}) = 35(.33\ldots)°$ and an attempt to use sine or tan
$\text{Height}^2 = 19.32$ or (Height =) $\sqrt{19.32}$ or (Height =) $7.6 \times \sin 35(.33\ldots)°$ or (Height =) $6.2 \times \tan 35(.33\ldots)°$	A1	
(Height =) 4.39(54... m) or 4.4(m)	A1	Do not allow 4.3(m) from premature rounding of 35.3345…° May be implied in further working Provided at least M2 previously awarded, FT from $\sqrt{}$'their 19.32' provided < 7.6 (m)
(Volume of concrete) $\frac{1}{2} \times (12.6 + 18.8) \times 4.4 \times 50$ or $\frac{1}{2} \times 31.4 \times 4.4 \times 50$ or $\frac{1}{2} \times (18.8 - 12.6) \times 4.4 \times 50 + 12.6 \times 4.4 \times 50$ or $\frac{1}{2} \times 6.2 \times 4.4 \times 50 + 12.6 \times 4.4 \times 50$	M2	FT 'their derived 4.4' provided • 'their derived 4.4' < 7.6 • 'their derived 4.4' ≠ 6.2 • 'their derived 4.4' ≠ 'their 18.8 – 12.6' May be seen in stages, e.g. with '× 50' in further working M1 for any one of the following: (Area of cross-section) • $\frac{1}{2} \times (12.6 + 18.8) \times 4.4$ (= 69.08 or 69.1m^2) • $\frac{1}{2} \times (18.8 - 12.6) \times 4.4 + 12.6 \times 4.4$ (= 13.64m^2 + 55.44m^2) (Volume cuboid) • $12.6 \times 4.4 \times 50$ (= 55.44 × 50 = 2772 m^3) (Volume triangular prism) • $\frac{1}{2} \times (18.8 - 12.6) \times 4.4 \times 50$ (= 13.64 × 50 = 682 m^3)
(Volume of concrete) Answer in the range 3450 (m^3) to 3455 (m^3)	A1	FT from previous M2 only and 'their derived 4.4' from an attempt to use Pythagoras' Theorem or cosine followed by sine or tan On FT from M2, allow a similar range from rounding or truncation If previous M0 A0, award SC1 for an answer of 4867 (m^3) from 'their 4.4' = 6.2

Unit 2: Intermediate Tier	Mark	Comments
9(a)(i) 5×10^8 or 5.0×10^8	B1	
9(a)(ii) **140** $\times 10^9$ $\div 300$ $\div 24$ 19 400 000 (kg per hour)	 M1 M1 M1 A2	<u>Method marks can be awarded in any order but the operation must be unique (not contradicted or repeated in the working)</u> '÷ 7200' implies final M1 M1 Award M3 for sight of $\frac{140 \times 10^9}{300 \times 24}$ or $\frac{1.4 \times 10^{11}}{7.2 \times 10^3}$ or equivalent ISW, accept 19.4 million or 1.94×10^7 or equivalent A1 for sight of 19 444 444(.44…) or for incorrect rounding or truncation of this answer FT, for A1, from M1 M0 M1 or M1 M1 M0, including if an incorrect 3rd term is included, for correct evaluation of 'their calculation' **and** expressing 'their final answer' correct to 3 significant figures provided rounding is required, e.g. • $140 \times 10^9 \div 300$ leading to 467 000 000 • $140 \times 10^9 \div 24$ leading to 5 830 000 000 • $140 \times 10^9 \div 300 \div$ *12* leading to *38 900 000* ($140 \times 10^9 \div 300 \times$ *24 = 11 200 000 000,* $140 \times 10^9 \div 24 \times$ *300 = 1 750 000 000 000,* *no rounding required, hence A0)* FT, for A1, from M0 M1 M1 for an answer of 194 000, 1 940 000, 194 000 000, or 1 940 000 000, provided it is from a correct evaluation of 'their calculation' If no marks, award SC1 for equivalent operations used without 140, i.e. $\frac{10^9}{300 \times 24}$ or $10^9 \div 300 \div 24$ or equivalent
9(b)(i) (Venus orbit) $2 \times \pi \times 1.08 \times 10^8$ or 678 000 000 to 680 000 000 or 6.78×10^8 to 6.8×10^8 (To find distance travelled in one day) $\div 224.7$ (Distance in one day) $3.(0....) \times 10^6$	M1 M1 A2	 FT 'their derived orbit' provided π is involved in 'their calculation of Venus orbit' CAO A1 for any one of the following answers: • (not in standard form) 3 000 000 (km) • (incorrect standard form) e.g. 30×10^5 • (in the range) 3 017 000 (km) to 3 026 300 (km) • (in terms of π) e.g. 961 281.7089π (km) • ($\pi \times 1.08 \times 10^8 \div 224.7 =$) $1.5(\ldots) \times 10^6$ If no marks, award SC1 for an answer of $4.8(0\ldots) \times 10^5$ (from $1.08 \times 10^8 \div 224.7$) or $9.6(1\ldots) \times 10^5$ (from $2 \times 1.08 \times 10^8 \div 224.7$)

Unit 2: Intermediate Tier	Mark	Comments
9(b)(ii) 368 187 456 (km^2)	B3	ISW Allow appropriate rounding from correct working, such as 368 187 500 or 368 000 000 or 370 000 000 B2 for any one of the following: • 8 × 460 234 320 ÷ 10 • 7 × 460 234 320 ÷ 10 + 460 234 320 ÷ 10 • 460 234 320 – 2 × 460 234 320 ÷ 10 • (2 × 460 234 320 ÷ 10 =) 92 046 864 • (7 × 460 234 320 ÷ 10 =) 322 164 024 B1 for any one of the following, including embedded in other working: • 460 234 320 ÷ 10 • (460 234 320 ÷ 10 =) 46 023 432 *If errors in calculating 1 + 7 or 1 + 2 + 7 are **seen**, then award B2 or B1 as appropriate e.g.* • *1 + 7 = 9, 9 × 460 234 320 ÷ 10* *B2* • *9 × 460 234 320 ÷ 10* *B1* *(embedded 460 234 320 ÷ 10)*