GCSE MARKING SCHEME

SUMMER 2025

GCSE
MATHEMATICS – NUMERACY
UNIT 2 – HIGHER TIER
3310U60-1

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 2025 MARK SCHEME

GCSE Mathematics – Numeracy **Unit 2: Higher Tier**	Mark	Comments
1. Appropriate method, e.g. • (Volume cylinder) $\pi \times 6^2 \times 20.6$ (compared with 1648 cm^3) • (Height cylinder) $\pi \times 6^2 \times$ height = 1648 or (height =) $\frac{1648}{\pi \times 6^2}$ • (Area X-sections) $\pi \times 6^2$ **with** 1648 / 20.6 • (Radius cyl) $\sqrt{\frac{1648 / 20.6}{\pi}}$ (compared with 6 cm)	M1	
Correct evaluation for the method used, e.g. • (Volume cylinder)(range) 2328(cm^3) to 2331(cm^3) • (Heights) (range) 14.5(cm) to 15(cm) • (Area X-sections) approximately 113 (cm^2) **with** (1648/20.6 =) 80 (cm^2) • (Radius cylinder) approximately 5 (cm)	A1	Allow height 14(cm), provided not from incorrect working. Answer for height may be from a trial
'Incorrect' stated or indicated	A1	Depends on M1 A1 previously awarded If no marks, due to error in not using πr^2 as the base area (in area or volume calculation), however 'their $\pi r^{2'}$ does include a product including π and 6 (or embedded as 12), but otherwise method, accuracy and conclusion correct for 'their $\pi r^{2'}$, award SC1
2. (Average speed =) $\frac{10 + 4}{0.75 + 1}$ or $\frac{10 + 4}{45 + 60} \times 60$ or equivalent	M2	M1 for idea of total distance/ total time, e.g. • $\frac{10+4}{45+1}$, $\frac{7}{23}$, 0.304…. • $\frac{10+4}{45+60}$, $\frac{2}{15}$, 0.133 … • $\frac{10+4}{1.45}$, $\frac{280}{29}$, $9\frac{19}{29}$, 9.655…
8 (km/h)	A1	CAO
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. $30\,000 \times 1.06^{10} \times 1.11^{15}$	M2	May be seen in stages M1 for appropriate sight of $\times 1.06^{10}$ or $\times 1.11^{15}$ 'Year by year' methods must convincingly show intention to multiply by 1.06 or 1.11 (or equivalent) each year for the correct number of years, allowing rounding or truncation to a pound each year
Answer in the range (£) 257 050 to (£) 257 055	A1	Accept (£) 257 000 or (£) 257 100 provided not from incorrect working Mark final answer
4(a)(i) Midpoints: 4000.5, 6000.5, 8000.5, 10 000.5	B1	Accept 4000, 6000, 8000, 10 000 or 4001, 6001, 8001, 10 001 throughout
22×4000(.5) + 30×6000(.5) + 42×8000(.5) + 6×10000(.5)	M1	FT 'their midpoints' provided at least 3 lie within the appropriate group, including bounds throughout
(88011 + 180015 + 336021 + 60003 = 664050) (88000 + 180000 + 336000 + 60000 = 664000)		
÷ 100	m1	
6640(.5 steps)	A1	Accept 6641 (steps) provided not from incorrect working ISW
4(a)(ii) 'Not possible to tell' unambiguously selected AND an appropriate reason, e.g. 'don't know how many steps the people in the last group actually did', 'some of the 6 people in the last group might have done more than 10 000 steps'	E1	Ignore additional incorrect or spurious statements Allow 'Not possible to tell' with the reason, e.g.: 'don't know the number of steps people did', 'grouped data', 'data is grouped', 'exact data not given', 'data is not specified', 'it doesn't specify how many of the 6 people did 10 000 steps', 'it doesn't specify how many people did 10 000 steps' 'it shows 6 people in the group 9001 to 11 000 steps', '6 people walked between 9001 and 11 000 steps', 'any of the 6 in the group 9001 to 11 000 could have done 10 000', 'it shows 6 people did more than 9001 but less than 11 000' 'we don't know how many steps they did accurately', 'the number of steps category goes above 10 000', 'someone in the last group may not know exactly how many steps they did' Do not accept, 'Not possible to tell' with a reason, e.g. 'it is only an estimate', 'the maximum is 11 000 steps'
4(b)(i) $(18 \times 5802 + 4 \times 9830 + 3 \times 12200) \div 25$ or $(4\times18\times5802 + 4\times4\times9830 + 4\times3\times12200) \div 100$	M2	(= (104436 + 39320 + 36600) ÷ 25 = 180356 ÷ 25) (= (417744 + 157280 +146400) ÷100 = 721424÷100) M1 for any one of the following: • $18 \times 5802 + 4 \times 9830 + 3 \times 12200$ • $4\times18\times5802 + 4\times4\times9830 + 4\times3\times12200$ • sum of 3 products with at least one of these being the correct products, with division by 25 or 100 as appropriate
7214(.24 steps)	A1	Allow 7215 provided not from incorrect working

4(b)(ii) Suitable reason, e.g. 'majority of the people were in the group that didn't meet their target', '72% were in the group that didn't achieve the target', 'only 28% (or $\frac{7}{25}$) of the people were in the two groups that met their target'	E1	Ignore additional incorrect or spurious statements Allow, e.g. 'most of the people didn't meet their target', 'more people in group A', '2 of the 3 groups does not mean two thirds', 'data is grouped, we don't know how many people met the target', 'there is not an equal number of people in each group', 'different number of people in each group', 'different amounts in each group' Do not accept, e.g. 'groups B and C met their target', 'some people in a group could have met the target but others didn't', 'because 5802 out of 8000 in group A', 'because there were more people in the group', 'the group that did not meet their target could be a long way from their target', 'they don't say which groups reached their targets', 'they were grouped into different capabilities', 'it only shows the mean for each of the 3 groups', 'data is grouped', 'not all the targets were the same', 'group A did not reach their target'
5(a)(i) Three	B1	
5(a)(ii) (France per person) answer in the range 84(kg) to 85 (kg)	B2	B1 for appropriate sight of (France per person) or equivalent, e.g. **5 522 358 000 ÷ 65 400 000 (= 84.4...)** 5 520 000 000 ÷ 65 400 000 (= 84.4...) 5 500 000 000 ÷ 65 400 000 (= 84.09...) 5 500 000 000 ÷ 65 000 000 (= 84.6...) 6 000 000 000 ÷ 70 000 000 (= 85.7…)
(In the range) 1.27 to 1.4 (times)	B2	Accept an equivalent fraction in this range FT provided at least B1 previously awarded, for 'their France per person' ÷ China per person accurately evaluated, provided 61 ≤ 'their China per person' ≤ 66 B1 for appropriate sight of 'China per person' evaluated, allow rounded or truncated to an integer value, e.g. **91 646 213 000 ÷ 1 440 000 000 = 63.6..** 91 600 000 000 ÷ 1 440 000 000 = 63.6.. 92 000 000 000 ÷ 1 440 000 000 = 63.8.. 92 000 000 000 ÷ 1 400 000 000 = 65.7.. 92 000 000 000 ÷ 1 500 000 000 = 61.3.. 90 000 000 000 ÷ 1 000 000 000 = 90 The answers in the statement takes precedence In this question, if 1 of the 2 numbers **shown** in an appropriate division has an **initial** 'factor of 10' place value error, treat this as a misread allowing a possible B1 (rather than B2) in either stage, may be implied by 'their answer'

5(b)(i) Answer in the range 278 to 284 (people per km^2)	B2	B1 for appropriate sight of any one of the following: • 67 600 000 ÷ 242 500 • use of approximations, e.g. o 67 600 000 ÷ 243 000 (= 278.18...) o 68 000 000 ÷ 243 000 (= 279.8...) o 68 000 000 ÷ 240 000 (= 283.3...) o 70 000 000 ÷ 200 000 (= 350) The answer in the statement takes precedence In this question, if one of the two numbers **shown** has an **initial** 'factor of 10' place value error, treat this as a misread, allowing possible B1 (for appropriate division), may be implied by 'their answer'
5(b)(ii) 5 199 825 000 ÷ 1000 ÷ 242 500 Answer in the range 21 to 22 (tonnes)	 M1 M1 A1	Allow suitable approximation, e.g. 5 200 000 000 or 5 000 000 000 Method marks may be awarded in either order May be implied in working, e.g. starting 5 199 825 Allow suitable approximation, e.g. 200 000 or 240 000 or 242 000 or 243 000 Only accept answers in the range, however allow 20 (tonnes) provided not from incorrect working Answer space takes precedence If no marks, award SC1 for an unsupported answer with digits 214(4…) In this question, excluding 1000, if one of the other 2 numbers **shown** has an **initial** 'factor of 10' place value error, treat this as a misread
6. (Angle between the ground and the ladder =) $\tan^{-1} 4(/1)$ 75.96(...°) or 76(°)	 M2 A1	Allow an alternative **full** method M1 tan (angle between ground and ladder) = 4 (/1) ISW Allow 75(°) or 75.9(°) provided not from incorrect working

7(a)(i) 900 (%)	B1	
7(a)(ii) $\frac{20}{25}$ × 7.7 ÷ 6.6 (× 100) or equivalent	M2	May be seen in stages Accept equivalents to $\frac{20}{25}$, e.g. $\frac{4}{5}$, 0.8 or $\frac{80}{100}$ M1 for appropriate sight of any one of the following, or equivalent, may be embedded in further working: • $\frac{20}{25}$ × 7.7 (= 6.16) • $\frac{20}{25}$ ÷ 6.6 (= 0.1212…) • 7.7 ÷ 6.6 (= 1.1666…) • 6.6 ÷ 7.7 (= 0.85714…)
(% of the 70% cocoa bar is) 93(.333... %)	A1	Allow an answer that rounds to 93(%) provided not from incorrect working FT from M1 to award A1 for the mass of the bar eaten (20 × 7.7 ÷ 6.6 =) 23(.33...g) If no marks, award SC1 for an answer of 68.57(..%) 68.6(%) or 69(%) (from 100 × $\frac{20}{25}$× 6.6 ÷ 7.7), i.e. starting with the incorrect bar
7(b) (Side of right-angled triangle (68 – 60) ÷ 2 =) 4 (mm)	B1	Accept seen on the diagram or implied in further working
4^2 + thickness^2 = 7^2 or (thickness^2 =) $7^2 – 4^2$	M1	FT 'their 4' provided < 7
thickness^2 = 33 or (thickness =) √33	A1	
(Thickness =) 5.7(4...mm) AND indicates 'True'	A2	Allow appropriate sight of 5.7(4…) = 6 as implication of 'True'' provided not contradicted in the answer box Ignore additional spurious statements A1 for 5.7(4...mm) FT from M1 for the correctly evaluated square root of 'their 33' provided 'their answer' < 7 (mm) for: either A2 (with appropriate conclusion true or false) or A1 (if no conclusion) If M0 A0 A0, award: either SC2 for 3.6(0555 mm) (from √($7^2 – 6^2$) = $\sqrt{13}$) or SC1 for $x^2 = 7^2 – 6^2$ or (x =) √($7^2 – 6^2$) OR either SC2 for 7.2(11.. mm) (from √($4^2 + 6^2$) = $\sqrt{52}$) or SC1 for $x^2 = 4^2 + 6^2$ or (x =) √($4^2 + 6^2$)
7(b) <u>Alternative method</u> (Use of bounds) *(Side of right-angled triangle (68 – 60) ÷ 2 =) 4 (mm)*	*B1*	*Allow use of 6.499(… mm) for 6.5(mm)*
$x^2 = 7^2 – 6.5^2$ or (x =) √($7^2 – 6.5^2$) *AND* *$x^2 = 7^2 – 5.5^2$ or (x =) √($7^2 – 5.5^2$)*	*M2*	*M1 for $x^2 = 7^2 – 6.5^2$ or (x =) √($7^2 – 6.5^2$)* *OR* *$x^2 = 7^2 – 5.5^2$ or (x =) √($7^2 – 5.5^2$)*
4.3(30… mm) AND 2.59(8… mm) or 2.6(mm) AND indicates 'True' *OR similar using 4(mm) with 5.5(mm) and 6.5(mm) working towards 7(mm)*	*A2*	*A1 for 4.3(30… mm) OR 2.59(8… mm) or 2.6(mm)*

8(a)		FT until 2nd error
$v^2 = u^2 + 2gh$ or $50^2 = 3^2 + 2\times9.8\times h$	B1	or equivalent, e.g. $2500 = 9 + 19.6h$ Do not allow any FT if: • $50^2 = (3^2 + 2\times9.8)\times h$ or • $\frac{50^2}{(3^2 + 2\times9.8)} = h$ is their next step If $50 = \sqrt{(3^2 + 2 \times 9.8)h}$ is their first step, then first B1 at most could be awarded if they then deal with the square root appropriately
$v^2 - u^2 = 2gh$ or $50^2 - 3^2 = 2\times9.8\times h$	B1	
$\frac{v^2 - u^2}{2g} = h$ or $\frac{50^2 - 3^2}{2\times9.8} = h$	B1	
(h =) 127(.091…) or 127.1 (m)	B1	If an unsupported 127(.091…) or 127.1 seen, allow B1B1B1B1 On FT, only award this final B1 if h > 0
8(b) Use of 6.05×10^{24} AND 1.085×10^{21}	B1	Accept use of $6.0499(\ldots) \times 10^{24}$ for 6.05×10^{24} throughout Do not allow use of 6.049×10^{24}
(Greatest possible density =) $(6.05 \times 10^{24}) \div (1.085 \times 10^{21})$	M1	If B0, FT provided unambiguously chosen: $6.0 \times 10^{24} <$ 'their 6.05×10^{24}' $\leq 7 \times 10^{24}$ and $1 \times 10^{21} \leq$ 'their 1.085×10^{21}' $< 1.09 \times 10^{21}$
= 5576(.03…) (kg/m^3) or equivalent	A1	CAO Allow an answer of 5580 provided no incorrect work seen ISW
8(c) (Distance travelled by the Earth in 1 year =) $29700 \times 365 \times 24 \times 60 \times 60$ or 29700×31536000 (= 936 619 200 000 or 9.366192×10^{11})	M2	Allow use of 365.25 for all marks M1 for correct use of 29700 with any 3 of 365, 24, 60 and 60, which may be embedded in further incorrect working If no evidence of 29700×365, allow M1 to be implied by a value in the range 9×10^{11} to 9.7×10^{11} $365 \times 24 \times 60 = 525600$ $365 \times 60 \times 60 = 1314000$ $24 \times 60 \times 60 = 86400$
(Radius of Earth's motion around the Sun =) $\frac{29700 \times 365 \times 24 \times 60 \times 60}{(2\times)\ \boldsymbol{\pi}}$ or $\frac{936\ 619\ 200\ 000}{(2\times)\ \boldsymbol{\pi}}$	M1	FT 'their 936 619 200 000' provided it comes from a calculation that includes 29700×365 OR FT if no evidence of 29700×365 but 'their 936 619 200 000' is in the range 9×10^{11} to 9.7×10^{11} Do not award this M1 if this calculation is then square rooted Accept values of $\boldsymbol{\pi}$ from 3.14 to 3.142
= 1.49×10^{11} to 1.5×10^{11} (m)	A1	FT from M1M1 Must be correct for $\frac{\text{'their 936 619 200 000'}}{2 \times \boldsymbol{\pi}}$ AND be written in standard form On FT, accept truncation or rounding of the mantissa

9(a)(i) Angle RNT = (162 – 115 =) 47 (º) (Distance between Rome and Tunis =) $\sqrt{470^2 + 805^2 - 2 \times 470 \times 805 \times \cos(162 - 115)}$ or $\sqrt{470^2 + 805^2 - 2 \times 470 \times 805 \times \cos 47}$ (= √352856.8…) = 594(.017…) (km)	B1 M2 A1	May be shown on the diagram or implied in further working FT 'their Angle RNT = 47' provided it is < 90 M1 for $470^2 + 805^2 - 2\times470\times805\times\cos(162 - 115)$ or $470^2 + 805^2 - 2\times470\times805\times\cos47$ CAO If no marks awarded, SC1 for an answer of 1260(.392…) or 1260.4 (km) from $\sqrt{470^2 + 805^2 - 2 \times 470 \times 805 \times \cos 162}$
9(a)(ii) Angle VNT = (234 – 162 =) 72 (º) (Angle NVT =) $\sin^{-1}\left(\frac{\sin 72}{970} \times 805\right)$ = 52.1(181…) (º) (Bearing of Tunis from Valencia =) 180 – (360 – 234) + 52.1(181…) or 54 + 52.1(181…) = 106(.118…)(º)	B1 M2 A1 m1 A1	May be shown on the diagram or implied in further working FT 'their Angle VNT = 72' provided it is < 120 M1 for $\frac{\sin(\text{Angle NVT})}{805} = \frac{\sin 72}{970}$ or equivalent CAO Mark final answer Accept 52 (º) provided no incorrect work seen FT 'their 52.1(181…)' provided M2 or M1 previously awarded On FT, if their bearing < 100, then their answer needs to be written using 3 figures, allowing decimals
9(b) Appropriate sight of $\sqrt[3]{6}$ or $\sqrt[3]{\frac{1}{6}}$ (= 1.817…) (= 0.550…) (Length of small toy plane =) $30 \div \sqrt[3]{6}$ or $30 \div 1.8(171\ldots)$ OR $30 \times \sqrt[3]{\frac{1}{6}}$ or $30 \times 0.55(0321\ldots)$ = 16.5(096…) or 16.51 (cm)	B1 M1 A1	May be embedded in further working Or equivalent e.g. $\sqrt[3]{4500}$ The award of M1 implies B1 Penalise an answer of 16.5 if evidence of premature approximation e.g. 30 ÷ 1.82 = 16.48 with a final answer of 16.5 would be awarded B1M1A0

9(c) Statements required: • Number the toy planes from (00)1 to 200 • Consider successive 3-digit numbers • Use numbers in the range e.g. Use the numbers (00)1 to 200 or Do not use 000 and 201 – 999 • Ignore repeats (Working in rows would give toy planes) 133, (0)16, ~~133~~, 182, 125, (0)17 OR (Working in columns would give toy planes) 133, (0)16, ~~133~~, (0)17, 182, 125	E2 B1	All 4 needed for E2 E1 for any 2 or 3 correct statements The numbering (00)1 to 200 can be implied by the range of numbers they state they will choose from Any alternative numbering system e.g. (00)0 to 199 needs to be clearly stated Allow the 2nd statement to be implied by their numbering of the toy planes (from 001) AND their use of 3-digit numbers in their answer OR 3-digit numbers used in their answer and e.g. 016 seen Do not allow 'Use numbers less than 201' or 'Ignore numbers greater than 200' if they have numbered the toy planes from 001 to 200 without referencing ignoring 000 ISW Allow these numbers in any order
9(c) <u>Alternative method:</u> *Statements required:* • *Number the toy planes from (00)1 to 200* • *Consider successive 3-digit numbers* • *Divide each number by 200 and use the remainder to choose a toy plane* • *If the remainder is 0, then toy plane 200 is chosen, and ignore repeats* *(Working in rows would give toy planes)* *(0)49, 133, (0)16, ~~(0)49~~, 185, 120* *OR* *(Working in columns would give toy planes)* *(0)49, (0)89, 157, 133, ~~(0)49~~, 155*	*E2* *B1*	*All 4 needed for E2* *E1 for any 2 or 3 correct statements* *The numbering system can be implied by the division by 200 and how they say they will deal with the remainder of (00)0* *Allow the 2nd statement to be implied by their numbering of the toy planes (from 001) AND their use of 3-digit numbers in their answer* *OR* *3-digit numbers used in their answer and e.g. 049 seen* *If (00)0 to 199 used, when the remainder is 0, toy plane (00)0 is selected* *ISW* *Allow these numbers in any order*

10. 400 $\times 1.002^{10}$ (=(£)408.07(…))	M1	These two M1 marks may be performed in either order
$\times 1.017^2$	M1	**FT from M0 previously awarded** Must be from use of 400 The intermediate answer if done in reverse order is (£)413.71(56)
= (£)422.06(…)	A1	CAO. May be implied in further working
(AER =) $\frac{422.06(\ldots) - 400}{400}$ (× 100) OR $\frac{422.06(\ldots)}{400}$ (× 100) − 1 (×100)	M1	FT 'their 422.06(…)' provided it comes from $400 \times a^{10} \times b^2$ where both a and b are > 1 but < 1.2
= 5.52 (%)	A1	Must be correct to 2 d.p. If no marks awarded, SC2 for an answer of 5.54 (%) from $\left(1+\frac{(0.2\times10+1.7\times2)/100}{12}\right)^{12}-1$ or $\left(1+\frac{5.4/100}{12}\right)^{12}-1$ OR SC1 for $\left(1+\frac{(0.2\times10+1.7\times2)/100}{12}\right)^{12}-1$ or $\left(1+\frac{5.4/100}{12}\right)^{12}-1$
10. Alternative method:		
$1.002^{10} \times 1.017^2$	*M2*	*M1 for any one of the following:* • *$1.002^{10} \times \ldots$.* • *$1.017^2 \times \ldots$.*
= 1.05516(…)	*A1*	*CAO. May be implied in further working*
(AER =) (1.05516(…) – 1) ×100	*M1*	*FT 'their 1.05516(…)' provided it comes from $a^{10} \times b^2$ where both a and b are > 1 but < 1.2*
= 5.52(%)	*A1*	*Must be correct to 2 d.p.*

11. (Area of curved rectangular sheet =) $\frac{75}{360}\times 2\times\pi\times 2.5\times 6$	M1	Accept values of π from 3.14 to 3.142
= 19.6 to 19.64	A1	Or $25\pi/4$ or equivalent Note: an answer of 19.6(…) from $\pi\times 2.5^2$ is awarded M0A0 If no marks awarded, SC1 for any one of the following: • $\frac{75}{360}\times 2\times\pi\times 2.5$ (= 3.2 to 3.3 or $25\pi/24$) • $\frac{75}{360}\times\pi\times 2.5\times 6$ (= 9.8 to 9.82 or $25\pi/8$)
(Area of an end sheet =) $\frac{75}{360}\times\pi\times 2.5^2 - \frac{1}{2}\times 2.5\times(2.5-1.4)\times\sin 75$ or equivalent (= 4.08 to 4.1) (= 1.32 to 1.33)	M2	May be embedded within the calculation for both ends M1 for any one of the following: • $\frac{75}{360}\times\pi\times 2.5^2$ • $\frac{1}{2}\times 2.5\times(2.5-1.4)\times\sin 75$
= 2.75 to 2.8 (m^2)	A1	CAO May be implied by (2 × (2.75 to 2.8) =) 5.5 to 5.6
(Total area = 19.634… + 2 × 2.762… =) 25.1 to 25.24 (m^2)	B1	Allow an answer of 25 (m^2) provided from correct working FT 'their 19.6 to 19.64' + 2 × 'their 2.75 to 2.8' provided at least 2 method marks previously awarded