



GCSE MARKING SCHEME

AUTUMN 2023

**GCSE
MATHEMATICS – NUMERACY
UNIT 1 – INTERMEDIATE TIER
3310U30-1**

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

AUTUMN 2023 MARKING SCHEME

GCSE Numeracy Unit 1: Intermediate Tier	Mark	Comments
1(a) $\frac{3}{10}$	B2	Mark final answer B1 for $\frac{15}{50}$ or $\frac{30}{100}$
1(b) $20 \times 25 + 28 \times 15 + 17 \times 10$ (= 500 + 420 + 170) (£) 1090	M2 A2	M1 for either - sight of the sum of any 2 unique appropriate products (not multiples of these products) or - for sight of 20×25, 28×15 and 17×10 A2. Answer space takes precedence FT from M2 or M1 to award A1 for either - any 2 of 500, 420 and 170 in a correctly evaluated sum of 3 products or - sight of 500, 420 and 170 <u>If no marks,</u> - award SC1 for sight of (Saturday and Sunday interchanged) $17 \times 25 + 28 \times 15 + 20 \times 10$ AND EITHER SC2 for an answer of (£)1045 OR SC1 for one of the following: - any 2 of 425, 420 and 200 in a correctly evaluated sum of 3 products - sight of 425, 420 and 200 - award SC1 for sight of (table followed in order used in Venn) $20 \times 25 + 17 \times 15 + 28 \times 10$ AND EITHER SC2 for an answer of (£)1035 OR SC1 for one of the following: - any 2 of 500, 255 and 280 in a correctly evaluated sum of 3 products - sight of 500, 255 and 280

2(a) $\frac{90}{360} \times 540$ or $\frac{1}{4} \times 540$ or $540 \div 4$ or equivalent 135 (people)	M1 A1	Answer space takes precedence When repeatedly halving 540, if there are errors, award M0 A0 unless indication that the intention is to divide by 2, e.g. • $540 \div 2 = 220$ (error) , $220 \div 2 = 110$ is M1 A0 • 540, 220, 110 is M0 A0
2(b) Angle measured $170(^{\circ}) \pm 2(^{\circ})$ $0.4 \times 170(^{\circ} \pm 2^{\circ})$ or equivalent $68(^{\circ})$ or angle in the range $67(^{\circ})$ to $69(^{\circ})$	B1 M1 A1	May be seen on the pie chart FT for 'their angle, provided $90^{\circ} < \text{'their angle'} < 180^{\circ}$ Any method of repeated addition must clearly be addition to 40% Only allow angles in this range provided not from incorrect working Answer space takes precedence Allow A1 for labelled angle on the pie chart if no final answer given. On FT, using 'their 170', allow angles correctly rounded or truncated to the nearest degree
2(c) $540 - \frac{7}{10} \times 540$ or $(1 - \frac{7}{10}) \times 540$ or $\frac{3}{10} \times 540$ 162 (not children)	M1 A1	For complete method Answer space takes precedence If no marks, award SC1 for sight of $(\frac{7}{10} \times 540 =) 378$

3(a)(i) $(1 \times)$ $\frac{10}{4} \times 1000$ or $1000 \times 10 \div 4$ or 1000×2.5 or equivalent 2500 (cm³)	M2 M1 for appropriate sight (that need not be within a product) of any one of the following: 2.5 (may be seen in the answer space) $\frac{10}{4}$ $10 \div 4$ (1 litre =) 1000 (cm³) - sight of digits 25 with incorrect place value A1 CAO. Answer space takes precedence
3(a)(ii) 2.4 (kg)	B2 Answer space takes precedence B1 for any one of the following: - attempt to multiply 200 by 12 which may include a place value error, or equivalent shown as repeated addition, e.g. 2×12, 20×12, 2000×12, ... - sight of 2400 in working - an answer of 2400 $\frac{48}{4} \times 200$ 2kg 400g
3(a)(iii) 1 : 8 : 2	B2 Answer space takes precedence If units (g) are included then B1 only. B1 for sight of any one of the following (ignoring inclusion of 'g'): 25 : 200 : 50 5 : 40 : 10 - equivalent multiple of the ratio 1 : 8 : 2 - a ratio involving 1, 8 and 2 in an incorrect order
3(a)(iv) Sight of a suitable division, e.g. $400 \div 28$ $400 \div 25$ $400 \div 30$ $390 \div 30$ Answer in the range 13 to 16	M1 Allow if written as a fraction rather than as a division A1 Must be from sight or attempt at a suitable division or unsupported Allow an answer in the range from sight of repeated addition or multiplication (that may include rounding within additions)
3(b)(i) 6 g	B1
3(b)(ii) (Daily recommendation =) 0.8×70 56 (g) 25 (%)	M1 Allow if embedded in further incorrect working only if this working includes the use of '14' A1 Ignore any incorrect unit given, e.g. % or kg A2 FT $\frac{14}{28}$ for possible A2 or A1 'their 0.8×70' On FT allow rounding or truncation of the final percentage A1 for one of the following: - the fraction $\frac{14}{56}$ or $\frac{7}{28}$ or $\frac{1}{4}$ - a clear full method finding percentages of 56(g) clearly working towards 14(g)

4(b) Sight of 30 000 – 10 000 or 20 000 $(30\,000 - 10\,000) \times 0.22$ or $20\,000 \times 0.22$ or equivalent (\$) 4400	B1 M1 A1	Ignore incorrect units given throughout Any repeated addition method of 10% and 1% must clearly show addition to 22% CAO. Mark final answer
5(a) $209^\circ \pm 2^\circ$	B1	Answer space takes precedence
5(b)(i) Answer in the range 21 (km) to 25 (km)	B1	Answer space takes precedence
5(b)(ii) Correct interpretation of the map scale, e.g. 1 cm represents 25 000 cm or 250 m 2 cm represents 50 000 cm or 500 m or 0.5 km 4 cm represents 100 000 cm or 1 000 m or 1 km OR Correct conversion 12 km to cm, 25 000 cm to km or equivalent, e.g. (12 km =) 1 200 000 (cm) (25 000 cm =) 0.25 (km) - sight of 1200 and 25 - sight of 12 and 0.25 $12 \div 0.25$ or 12×4 or $1\,200\,000 \div 25\,000$ or $1\,200 \div 25$ or equivalent 48 (cm)	B1 M1 A1	Ignore place value error, e.g. 12 ÷ 'their number with digits 25', 12 × 'their number with digit 4' CAO
5(b)(ii) <u>Alternative method</u> (Original map scale is 3 cm : 12 km =) 3 : 1 200 000 or 1 : 400 000 or equivalent $\frac{400\,000}{25\,000} \times 3$ or 16×3 or equivalent 48 (cm)	B1 M1 A1	Ignore errors in place value CAO

6(a)(i) Correct statement of Pythagoras' theorem • $(\text{Height}^2 =) 50^2 - (60 \div 2)^2$ • $(\text{Height}^2 =) 50^2 - 30^2$ • $50^2 = \text{height}^2 + (60 \div 2)^2$ • $50^2 = \text{height}^2 + 30^2$ Correct stage of evaluation • $(\text{Height}^2 =) 2500 - 900$ • $(\text{Height}^2 =) 1600$ • sight of $\sqrt{1600}$ • $(\text{Height} =) \sqrt{(50^2 - 30^2)}$ $(\text{Height} =) \sqrt{1600}$ $(\text{Height} = 40 \text{ mm})$ or $\text{Height}^2 = 1600$ $(\text{Height} = 40 \text{ mm})$ or $1600 = 40^2$ $(\text{Height} = 40 \text{ mm})$	M1 A1 A1	<u>Clear indication that all measurements have been converted to 3cm, 5cm, 4cm may be awarded all marks</u> Working must be seen Allow M1 A1 for a slip in the initial notation then corrected at this evaluation stage Mark final answer A0 for an incorrect statement, e.g. $\sqrt{1600} = 40^2$
6(a)(i) <u>Alternative method 1</u> Identifies the relationship '3, 4, 5' and relates to the given (right-angled) triangle, e.g. sight of • 3, 4, 5 and 30(mm), 40(mm), 50(mm) • 3cm, 4cm, 5cm • 3, 4, 5 and '$\times 10$' • 30, 40, 50 and '$\div 10$' AND a statement or conclusion, e.g. • Pythagorean triple • Right-angled triangle • 3, 4, 5 triangle means it would be 30, 40, 50 triangle	B3	For B3 there must be an accompanying statement or conclusion B2 for identifying the relationship '3, 4, 5' and relates to the given(right-angled) triangle • without a conclusion or statement, or • with an incorrect conclusion or statement B1 for sight of any one of the following: • '3, 4, 5' • 30 (mm) and 40 (mm) appropriately indicated on the diagram • A right-angled triangle drawn (with or without 90° indicated) appropriately labelled 30 (mm), 40 (mm) and 50 (mm)
6(a)(i) <u>Alternative method 2</u> Assuming height as 40mm with use of 50mm or 30mm within a correct statement of Pythagoras' Theorem, e.g. • $((\frac{1}{2} \text{ base})^2 =) 50^2 - 40^2$ • $50^2 = 40^2 + x^2$ • $((\text{hypotenuse})^2 =) 40^2 + 30^2$ Correct stage of evaluation, e.g. • $((\frac{1}{2} \text{ base})^2 = 50^2 - 40^2 =) 900$ • $(\frac{1}{2} \text{ base} =) \sqrt{900}$ • $((\text{hypotenuse})^2 = 40^2 + 30^2 =) 2500$ • $(\text{hypotenuse} =) (\frac{1}{2} \text{ base} =) \sqrt{2500}$ Appropriate full evaluation, e.g. • $(\frac{1}{2} \text{ base} =) 30 \text{ (mm)}$ • $(\text{hypotenuse} =) 50 \text{ (mm)}$	M1 A1 A1	<u>Clear indication that all measurements have been converted to 3cm, 5cm, 4cm may be awarded all marks</u> Working must be seen Mark final answer
6(a)(ii) (Volume) $\frac{1}{2} \times 60 \times 40 \times 20$ or equivalent 24 000 (mm³) (> 20 000 mm³)	M2 A1	M1 for sight of area of X-section possibly in stages, $\frac{1}{2} \times 60 \times 40$ or $\frac{1}{2} \times 30 \times 40 + \frac{1}{2} \times 30 \times 40 (= 1200 \text{ mm}^2)$ CAO

6(b) Sight of or implication that: $5 \times \text{number of people} + 105 = 207 + 3 \times \text{number of people}$ or $5x + 105 = 207 + 3x$ $(5 - 3) \times \text{number of people} = 207 - 105$ or $\text{number of people} = \frac{207-105}{5-3}$ or $5x - 3x = 207 - 105$ or $2x = 102$ 51 (people)	M1 m1 A1	Implication includes attempt to balance costing for the same number of people ≥ 3 at each venue, e.g. (10 people) $5 \times 10 + 105$ with $207 + 3 \times 10$ (110, 115,) 120 with (210, 213,) 216 Includes correctly evaluated trial to attempt to balance costing for the same number of people at each venue provided 'their trial for $30 \leq \text{the number of people} \leq 70$', e.g. correct costing for both venues for 40 people as (FH) (£)305 and (ML) (£)327 From M1, allow 1 slip in the rearrangement of 'their equation' provided 'their equation' is then simplified to $ax = b$, where $a \neq 0$ and $b \neq 0$ Sight of cost (£)360 for each venue implies M1 m1 CAO If no marks, award SC1 for finding the number of (whole) people for the same cost at each venue, provided the cost is $> (£) 220$
7. $(4(.)40 \div 3.3) \times 9 \div 10$ or $(\frac{9}{10} \times 4(.)40) \div 3.3$ or $4 \times \frac{9}{10} \div 3$ or equivalent full method (£)1.2(0) or 120(p)	M2 A2	<u>Accept equivalent in pence throughout</u> M1 for any one of the following or equivalent: (1kg Sparkle costs) $4(.)40 \div 3.3$ $(= \frac{4(00)}{3})$ (3.3kg Dazzle costs) $\frac{9}{10} \times 4(.)40$ $(= 3(.)96)$ (3kg Dazzle costs) $4 \times \frac{9}{10}$ $(= 3(.)60)$ (3kg Sparkle costs) $4(.)00$ CAO. If units are given they must be correct Do not award A2 or A1 from incorrect working Award A1 (from M1 or M2) for any one of the following: (1kg Sparkle costs) $\frac{4(00)}{3}$ or 1.33(...) or 133(..) (3.3kg Dazzle costs) 3(.)96 (3kg Dazzle costs) 3(.)60 Award A1 (from M2) for a correctly evaluated FT, with final answer rounded or truncated to a penny, for any one of the following: 'their $4(.)40 \div 3.3 \times \frac{9}{10}$ 'their $\frac{9}{10} \times 4(.)40 \div 3.3$ 'their $4 \times \frac{9}{10} \div 3$

8(a)(i) (2.5, 42) stated with a suitable line of best fit drawn through this point	B2	For B2 do not ignore the answer space stating an incorrect point, or giving reverse coordinates Conditions of a suitable line of best fit: • The straight line (accept intention if a ruler is not used) must have points above and below it • The line must be of sufficient length, to illustrate trend for at least 6 points • The trend shows that there are points above and below the line towards each end of the line For B2 the point (2.5, 42) must be stated or plotted with a suitable line of best fit through this point. If (2.5, 42) is not stated or plotted, then it is only possible to award a maximum of B1 Allow B2 for one of the following: • a blank answer space with (2.5, 42) plotted with a suitable line of best fit through (2.5, 42) • (2.5, 42) stated in the answer space, but not plotted, with suitable line of best fit passing through (2.5, 42) B1 for sight of any one of the following: • (2.5, 42) stated in the answer space • blank answer space with (2.5, 42) indicated by a correct plot • A suitable line of best fit for the given points: ○ with no additional point plotted ○ passing through 'their additional incorrect point' (plotted) ○ suitable if 'their additional incorrect point' plotted is ignored
8(a)(ii) Reading from line of best fit for number of cups (tolerance to the nearest gridline) for rainfall of 2.0 mm	B1	Answer space takes precedence STRICT FT from (a)(i) 'their line of best fit' which must be drawn for negative correlation No mark is awarded if no line of best fit drawn in (a)(i)
8(b) $5 \times 18 + 5 \times 0.5$ or 18.5×5 92.5 (cm)	M1 A1	Allow for $18 < \text{'their 18.5'} \leq 19$ CAO If no marks, award SC1 for sight of 18.5 (cm) or 18.4999(... cm) provided clearly a recurring 9 digit
8(c) Selects or unambiguously implies 'No' with a reason, e.g. '(Space) minimum 97.25 (cm) (which is less than 97.3 cm)'	E1	Allow 'No' with a reason, e.g. '97.25 (cm)' 'least 97.25 and (greatest) 97.75' Do not accept 'No' with the reason, e.g. '97.75 (cm)'

9(a)(i) Entries 146 and 160 in the table and the cumulative frequency diagram completed correctly (correct plots (11, 146) and (13, 160) and all plots joined)	B2	B1 for any one of the following: 146 and 160 in the table, correct plots but not joined 146 and 160 in the table, with one correct plot and one incorrect plot in completing the cumulative frequency diagram with plots joined - one error in the table, including FT 'their 146' + 14 and these cumulative entries used correctly to complete the cumulative frequency diagram with plots joined - correct cumulative frequency diagram with plots joined, with incorrect, incomplete or not attempted entries in the table
9(a)(ii) 8.2 to 8.4 (minutes)	B1	Answer space takes precedence Allow 8 minutes 12 seconds to 8 minutes 24 seconds FT reading from the graph for 'their median', from $\frac{1}{2} \times$ 'their 160', provided 'their 160' ≥ 110, with a tolerance of $\frac{1}{2}$ small square from 'their cumulative frequency graph', provided it is possible to read 'their median' from the vertical axis on the graph paper provided
9(a)(iii) 7.2 minutes	B1	Answer space in the statement takes precedence, if blank award for indication of '7.2' (circled) in the list Allow '7' in the answer space provided 7.2 indicated in the list Do not accept '8' in the answer space if 7.2 indicated in the list
9(a)(iv) $\frac{20}{160} (\times 100)$ or $\frac{1}{2} \times 25$ (%) or equivalent 12.5 (%) or 12½ (%)	M1 A1	FT for $(100 \times) 20$/'their 160', provided 'their 160' > 106 On FT allow rounding or truncation to 1 decimal place
9(b) (Costs are $180 + 220$) (£) 400 AND (Profit is $700 - 180 - 220$) (£) 300 OR (Receipts / Costs =) $\frac{700}{400} (\times 100)$ (Percentage profit is) $\frac{300}{400} (\times 100)$ or $\frac{700}{400} (\times 100) - 1 (\times 100)$ 75 (%)	B1 M1 A1	May be embedded, e.g. $700 - 400 = 300$ (= 1.75 or 175%) FT 'their 400' and $700 -$ 'their 400' provided their costs or profit are $\neq 180$, $\neq 220$ and $\neq 700$ CAO Allow if all costs and the total are consistently multiplied by 3.
9(c) $8(.)40 \div 1(.)20$ or $8(.)40 - 8(.)40 \div 6$ or equivalent (£) 7 or 700 (p)	M1 A1	Accept a complete and convincing method of trial and improvement If units are given they must be correct Sight of $7 + 1.40 = 8.40$ is awarded M1 A0 unless (£)7 is selected

10(a)(i) King Edward and 90(g)	B1	
10(a)(ii) $(90 - 52 =) 38(g)$	B2	Do not award from sight of any incorrect working B1 for sight of any of the following: • 52 and 90 • Sight of 90 and $50 < \text{'their lowest mass'} \leq 54$ and $90 - \text{'their lowest mass'}$ correctly evaluated • Answer of 35(g) and unambiguous selection of ○ (King Edward) 98 and 63 or ○ (Desiree) 88 and 53
10(b) Selects: Desiree, and Interquartile range and less than for the other 2 varieties	E1	
11. (Width of poster) $2 \times \frac{26.4}{2.4}$ or 2×11 or equivalent 22 (cm) (Perimeter of poster $2 \times (22 + 26.4) =$) 96.8 (cm) 100 (cm)	M1 A1 A1 B1	Mark final answer for the width of the poster FT 'their 22' provided M1 previously awarded FT provided $95 < \text{'their 96.8'} < 100$, as 100 correct to 1 significant figure Accept working in mm or m, units must then be given in the final answer Do not accept an unsupported answer of 100 (cm)
11. <u>Alternative method</u> (Perimeter of stamp) 8.8 (cm) AND sight of $\frac{26.4}{2.4} (= 11)$ or $\frac{2.4}{26.4} (= \frac{1}{11})$ (Perimeter of poster) $(2 + 2.4 + 2 + 2.4) \times \frac{26.4}{2.4}$ or $8.8 \times \frac{26.4}{2.4}$ or 8.8×11 or equivalent 96.8 (cm) 100 (cm)	B1 M1 A1 B1	FT 'their $2 + 2.4 + 2 + 2.4$' FT provided $95 < \text{'their 96.8'} < 100$, as 100 correct to 1 significant figure Accept working in mm or m, units must then be given in the final answer Do not accept an unsupported answer of 100 (cm)