GCSE MARKING SCHEME

AUTUMN 2022

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

INTRODUCTION

This marking scheme was used by WJEC for the 2022 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 2022 MARK SCHEME

Unit 1: Intermediate Tier	Mark	Comments
1(a) (Area of the small picture is) 10×5 OR (Area of the large picture is) 40×15	M1	
(Area of the small picture is) 50 (cm^2) (Area of the large picture is) 600 (cm^2)	A1 A1	May be implied in further working May be implied in further working
(Cost to print large picture is) $\frac{600}{50} \times 2(.00)$ OR For a full proportion **method** calculated correctly or or with working shown, e.g. $50cm^2$ is (£)2, $100cm^2$ is 2×2 (=£4), $150cm^2$ is $2 + 2 \times 2$ and $600cm^2$ is $4 \times (2 + 2 \times 2)$	M2	May be seen in stages FT 'their 10×5' and FT 'their 40×15' M1 for any one of the following: • (Cost to print $1cm^2$) 2(.00) ÷ 50 or 4(p) or (£)0.04 • 600 ÷ 50 or (600 ÷ 50 =) 12 or $12 \times 50 = 600$ • 'their cost to print per $1cm^2$' × 'their 40×15' • Proportion method that would lead to a correct response, but includes one error, e.g. $50cm^2$ is (£)2, $100cm^2$ is (£)4, $150cm^2$ is *without working* '*(£)5*' with $600cm^2$ is (4×5 = £) 20 • FT for 'their 50' and 'their 600' (including if perimeters or semi-perimeters)
(£)24 or 2400(p)	A1	Only FT from previous M2 If units are given they must be correct
1(a) Alternative method 1 *(To find the number of small pictures to cover area of the large picture) 40 ÷ 10 AND 15 ÷ 5*	*M1*	*Allow 40 ÷ 5 AND 15 ÷ 10*
4 (up) and 3 (across)	*A2*	*May be shown on a diagram* *Allow 8 and 1.5 (from 40 ÷ 5 = 8 and 15 ÷ 10= 1.5)* *A1 for any one of the 4 possible divisions accurately evaluated*
(Cost to print the large picture) *4 × 3 × (£) 2 or equivalent*	*M2*	*FT 'their 4 across and 3 up' provided 2 different values ≠ 1* *Allow 8 × 1.5 × (£)2* *M1 for appropriate sight of 4 × 3 or 8 × 1.5 including if embedded in other working*
(Cost to print large picture) *(£)24 or 2400(p)*	*A1*	*FT from M2 only* *If units are given they must be correct*
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.

1(b) (10 + 5 + 10 + 5) × (0.)40 or 30 × (0.)40 or 10 × (0.)40 + 5 × (0.)40 + 10 × (0.)40 + 5 × (0.)40 or 4 + 2 + 4 + 2 or 400 + 200 + 400 + 200 (£)12 or 1200(p)	M2 A1	M1 for sight of any one of the following: • 10 + 5 + 10 + 5 (= 30 cm) • (10 + 5) × (0.)40 (= £6 or 600p) • 10 × (0.)40 + 5 × (0.)40 (=£6 or 600p) • (2, 4,) 2 and 4 (check diagram) • (200, 400,) 200 and 400 (check diagram) • ('their height' + 'their width') × 2 x (0.)40 CAO. If units are given they must be correct If no marks, award SC1 for an answer of (£)44 or 4400(p) (working with the larger picture)
2(a) 20:40	B1	
2(b) 10(:)10 (a.m.) or 'ten past ten' or equivalent	B3	Allow use of decimal point, a gap, no gap as a 'spacer' in time throughout Accept times given in 24hr or a.m. format throughout. B2 for any one of the following: • sight of (0)9(:)48 (tram) • sight of (0)9(:)70 • arrives 5 minutes early (before 10(:)15) • an answer of 10(:)10 p.m. • use of multiples of 12 minutes from 8 a.m. with 8(:)12, 8(:)24 and 8(:)36 seen with an error in working but 22 mins correctly added to their final multiple (which must be between 09:36 and 09:53 inclusive) B1 for any one of the following: • use of multiples of 12 minutes from 8 a.m. with 8(:)12, 8(:)24 and 8(:)36 seen • (tram at) 9(:)00 • 10(:)00 with attempt to subtract 12 minutes • (10:00 tram arrives at) 10(:)22 • 60 ÷ 12 (= 5) or 5 × 12 = 60 • 5 trams per hour (until 10:00) An answer of 10(:)37 is awarded B0 unless any of criteria for B2 or B1 met

3(a) Compare **small** with **large** using same <u>volume</u>, e.g.
- Volume of 4 small cartons
- Cost of 4 small cartons
- Cost of 500ml of large carton

OR
Compare **medium** with **large** using <u>volume and cost</u>, e.g.
- Cost for 2400ml medium cartons
- Cost of 1000ml large carton

B1

Accept for 'their 4' from 2000 ÷ 500
Ignore incorrect units given

4 small	vol	4 × 500	2000ml
4 small	cost	4 × (0.)40	£1.6(0) or 160p
500ml large	cost	2(.)50 ÷ 4	£0.625 or 62.5p
2400ml medium	cost	2 × 1(.)20	£2.40 or 240p
1000ml large	cost	2(.)50 ÷ 2	£1.25 or 125p

Compare the **small** with the **medium** using <u>cost</u>, e.g.
- Volume for £1.20 in small cartons
- Cost of 3 small cartons
- Volume of 1/3 of a medium carton
- Cost of 400 ml medium carton

B1

Accept for 'their 3' from 1200 ÷ 400
Ignore incorrect units given

£1.20 in small	vol	3 × 500	1500 ml
3 small	cost	3 × (0.)40	£1.20 or 120p
1/3 medium	vol	1200 ÷ 3	400 ml
400 ml medium	cost	1(.)20 ÷ 3	£0.4(0) or 40p

Conclusion 'small' based on accurate calculations from full comparison

B1

Only FT from B1, B1
Must have consistent correct units or allow no units given

<u>3(a) Alternative method 1</u>
Method of comparing all 3 cartons, e.g.
ml per 10p or p per 100ml or £ per 6000 ml

M2

Ignore incorrect units given
M1 for attempt to compare at least 2 of the 3 cartons

	Small	*Medium*	*Large*
ml for 10p	*500 ÷ 4 = 125*	*1200 ÷ 12 = 100*	*2000 ÷ 25 = 80*
p per 100 ml	*40 ÷ 5 = 8*	*1(.)20 ÷ 12 = 10*	*2(.)50 ÷ 20 = 12.5 Allow 12 or 13*
£ per 6000ml	*12 × 0(.)40 = 4.80*	*5 × 1(.)20 = 6*	*3 × 2(.)50 = 7.50*

Conclusion 'small' based on accurate calculations from full comparison

A1

Only FT from M2
Must have consistent correct units or allow no units given
From division calculations, allow rounding and truncation provided it does not impact on being able to compare

3(b) 300 × 30 ÷ 12 or 300 × 2.5 or 30 × 25
or 2 × 300 + ¼ (2 × 300) or 600 + 150 or equivalent

M1

May be seen in stages

750(ml)

A1

CAO

4(a) (Area of lawn) ½ × 3 × 4 + ½ × 5 × 12 (To find cost of seed) × (0.)30 (£) 10.8(0) or 1080(p)	M2 m1 A1	(= 6 + 30 = 36 m^2) M1 for any one of the following: • sight of ½ × 3 × 4 and ½ × 5 × 12 • ½ × 3 × 4 **+** ….. • …. **+** ½ × 5 × 12 • Sight of either area correct, 6 or 30 FT from M1 FT from M1, m1 provided it is from the sum of 2 areas of triangles Allow if FT correctly evaluated area rounded up to the nearest m^2 If units are given they must be correct If no marks, award SC1 for an answer of (£)21.60 or 2160(p)
4(b)(i) (175 – 55) ÷ 8 or 120 ÷ 8 (£) 15	M1 A1	May be seen in stages CAO. Allow an embedded answer of 15, e.g. 8 × 15 = 120
4(b)(ii) (Total including VAT is) 175 + 175 × 0.2(0) or 175 × 1.2(0) or equivalent (£) 210	M2 A1	May be seen in stages M1 for (VAT) 175 × 0.2(0) or 17.5 + 17.5 (= 35) or equivalent If no marks, award • either SC2 for total including VAT correctly evaluated starting with charge 55, 15 or 'their 15' from (b)(i), i.e. 66, 18 or correctly evaluated 'their 15' × 1.20 • or SC1 for a calculation for total including VAT starting with charge 55, 15 or 'their 15' from (b)(i), i.e. 55 × 1.20, 15 × 1.20 or 'their 15' × 1.20 or equivalents
4(c)(i) 'No' selected or unambiguous implied with reason, e.g. 'no correlation' 'no pattern' '(points are) random' 'no trend' 'number of leaves is not affected by height'	E1	Allow, e.g. 'No' with 'different flowers have different (numbers of) leaves' 'scattered' ' the data (or answers) are not consistent' Do not accept, e.g. 'No' with 'there isn't a leaf with height 6cm' 'it does not show on the graph' 'there is no data for 6' 'it doesn't say how many there are' 'not enough research' 'sample too small' 'some points close together' 'data is not reliable'
4(c)(ii) 7.5 cm	B1	
4(c)(iii) 17.5 – 13 or 9 × 0.5 4.5 (cm)	M1 A1	Allow 13 – 17.5 Answer space takes precedence Allow FT -4.5 (cm) from 13 – 17.5 If no marks, award SC1 for the difference correctly evaluated provided either 17.5 or 13 is correct

4(c)(iv) 80(%)	B2	Answer space takes precedence B1 for sight of any of the following: • 8/10 • 8 ÷ 10 • (Including 23, 100 × 9 ÷ 10 =) 90 (%) B0 for '8 out of 10'
5(a) (North orchard, number of pear trees is) 3 × 35 ÷ (4 + 3) or 3 × 5 or equivalent 15 (pear trees) (West orchard number of pear trees is 2 × 15) 30 (pear trees) (West orchard number of cherry trees is) 11 × 30 ÷ 5 66 (cherry trees)	M1 A1 B1 M1 A1	 FT 'their derived 15' FT 'their derived number of pear trees' Allow M1 for a final answer of 88 (cherry trees from use of 40 apple trees as pear trees), but A0 FT answer must be evaluated correctly and lead to a whole number
5(b) (Mass of apples to make juice) 5280 ÷ 6 ÷ 2.2 400 (kg) (Number of litres of juice produced) 400 × 2 ÷ 5 or 2 ÷ (5 ÷ 400) or 2 × $\frac{400}{5}$ 160 (litres)	 M1 M1 A2 M1 A1	Method may be seen in either order M0 for statement '1/6 of 5280' without calculation Ignore incorrect units given May be seen or implied in later working A1 for any one of the following: • (5280 ÷ 2.2 =) 2400 • (5280 ÷ 6 =) 880 • a correct evaluation of 'their 2400' ÷ 6 • a correct evaluation of 'their 880' ÷ 2.2 FT 'their derived 400(kg)' (not 5280) If 'their derived 400' is used as g (rather than kg) allow M1 for 'their derived 400' × 2 ÷ 5000 or 2 ÷ (5000 ÷ 'their derived 400'), but A0
5(b) Alternative method *(Mass of apples used to make juice) 5280 ÷ 6* *880 (lbs)* *(Mass of apples in 2 litres) 5 × 2.2* *11 (lbs)* *(Number of litres of juice produced) 2 × 880 ÷ 11* *160 (litres)*	 *M1* *A1* *M1* *A1* *M1* *A1*	 *FT 'their derived 880' and 'their derived 11'*
5(c)(i) Method 1 for 200 jars (Cost of 200 jars) 200 × (0.)23 OR (Sales of 200 jars of jam) 200 × 1(.)60 (Cost of 200 jars) 4600(p) or (£)46 (Sales of 200 jars of jam) 32000(p) or (£)320 (Cost 200 jars + jam) (£94 +£46=) (£)140 or 14000(p) (Profit £320 - £140 =) 18000(p) or (£)180	 M1 A1 A1 B1 B1	 FT £94 + 'their derived £46' If units are given they must be correct FT 'their derived £320' – 'their derived £140'

5(c)(i) <u>Method 2 for 200 jars</u> *(Cost of jam for 200 jars) 200 × (1(.)60 – 0(.)23)* *(=) £) 274 or 27400(p)* *(Profit £274 - £94 =)18000(p) or (£)180*	 *M2* *A2* *B1*	 *M1 for 1(.)60 – 0(.)23 or (£)1.37 or 137(p)* *A1 for 200 × 1(.)37* If units are given they must be correct *FT 'their derived £274' – £94*
5(c)(i) <u>Method for 1 jar</u> *(Cost of ingredients for 1 jar of jam) 94(00) ÷ 200* *47(p) or (£)0.47* *(Cost of jam and jar) (23p + 47p =) 70(p) or (£)0.7(0)* *(Profit for 1 jar of jam £1.60 – 70p =) 90(p) or(£)0.9(0)* *(Profit for 200 jars of jam) 18000(p)* or *(£)180*	 *M1* *A1* *B1* *B1* *B1*	 *FT 'their derived 47p' + 23p* *FT £1.60 - 'their derived 70p'* *May be seen or implied in later working* If units are given they must be correct *FT 'their derived 90p'*
5(c)(ii) 3 × 48 ÷ 8 or equivalent 18 (cm)	M1 A1	
6(a) Whale indicated or implied on bearing 010° from Aberporth and 280° from Aberystwyth. Region in the sea inside a circle, centred at the whale, of correct (4cm) radius ± 2mm	B2 B2	Accept indication from one bearing line drawn with the second bearing shown on this line, including one line terminating at the correct intersection point B1 for either of the bearings correctly shown or unambiguously indicated, e.g. by an unambiguous mark on the correct bearing FT 'their position of the whale' For B2 the region must be entirely within the sea or on FT indicated as a region within the sea Allow intention of circle provided it lies completely within the tolerance given by the overlay B1 for (intention of a) circle, radius out of tolerance but within ± 4 mm, centred at the whale including any region on the land
6(b) 20 × 12 × 2.5 ÷ 100 6 (m)	M2 A1	M1 for any 3 of these 4 terms correct in a calculation which may be shown in stages CAO Answer given within the statement takes precedence Sight of 600 is awarded M1 and also SC1 provided not from incorrect working

6(c)(i) $\frac{13}{20}$ (× 100) or $\frac{12.5}{20}$ (× 100) or $\frac{12.8}{19}$ (× 100) or $\frac{12}{20}$ (× 100) or $\frac{12}{19}$ (× 100) or $\frac{12.8}{20}$ (× 100) or $\frac{13}{19}$ (× 100) or equivalent OR A trial and improvement method, considering percentages or decimals of 19 or 20 with a correct calculation shown between (60% of 19) 0.6 × 19 (= 11.4) and (70% of 20) 0.7 × 20 (= 14) inclusive	B1	Allow: • fraction written as division, e.g. 13 ÷ 20 • inclusion of consistent change of place value • a similar suitable fraction, e.g. 12/18
An answer in the inclusive range 60(%) to 70(%)	B1	Only award if B1 previously awarded, however allow B2 for an unsupported answer in this range. If no marks, award SC1 for any of the following answers: • 50(%) from $\frac{10}{20}$ (× 100) or equivalent • 52(%) to 53(%) from $\frac{10}{19}$ (× 100) or equivalent
6(c)(ii) (19 – 0.1 × 19) × 1000 000 000 or (19 – 0.1 × 19) × (1) × 10^9 or 0.9 × 19 × 1000 000 000 or 1.9 × 10^{10} × 9 × 10^{-1} or equivalent	M2	M1 for any one of the following: • for sight of digits 171 irrespective of place value • 19 – 0.1 × 19 • 19 billion – 0.1 × 19 billion • (19 – 0.1 × 19) × 1000 million • 0.9 × 19 • 1.9 × 10^{10} (19 billion in standard form) • 1.9 × 10^9 only if clearly calculated from 10% of 19 billion
1.71 × 10^{10}	A2	A1 for any of the following: • 17 100 000 000 • 1.71 × 10^4 million • equivalent correct value not given correctly in standard form, e.g. 17.1 × 10^9 • an answer of 1.7 × 10^{10} OR A1 for FT from M1 or M2 • 'their number' given correctly in standard form provided it is > 1.71 × 10^6 (including for the number in the last bullet point listed for M1) A0 for 17.1 billion or 17 100 million (M1 A0) Treat use of an estimate of 19 as a MR-1 from an accuracy mark, e.g. use of 20 gives an answer of 1.8 × 10^{10}, award (M2 A2 MR-1) 3 marks

7(a) Whiskers at 3 m and 22 m Unambiguous values or box with LQ 5 m and UQ 20 m Median at 15 m	B1 B1 B1	Ignore if lines omitted from the ends of the whiskers Must be the least and greatest values shown May be seen in working, must be clearly LQ and UQ Check cumulative frequency diagram If not clearly labelled in working or on the graph, they must be no other values given between • the least and the LQ, and • the greatest and the UQ May be seen in working, must be clearly the median Check cumulative frequency diagram If not an unambiguous unique line or point, i.e. not clearly labelled in working or on the graph, allow for a line (or point) indicated that is not the least or greatest value shown Only if B1 B1 B1 awarded, <u>penalise -1</u> if a correct format for a box-and-whisker diagram is not shown
7(b)(i) 0.75 × 68 or equivalent 51 (yachts)	M1 A1	Answer space takes precedence If no marks, award SC1 for sight of 17 (from 0.25 × 68)
7(b)(ii) Conclusion 'Eog' with sight of (Eog IQR 20 – 5 =) 15 (m) AND (Clwyd IQR 18 – 10 =) 8 (m)	B2	FT 'their UQ – LQ' from (a) box-and–whisker diagram B1 for either IQR correct
7(b)(iii) Conclusion 'Can't tell' with reason, e.g. 'only know that 25% of yachts in Clwyd Marina are greater than 18m' 'we don't know if any of the yachts in Clwyd Marina are greater than 22(metres, the longest in Eog Marina)' 'we don't know if a yacht in Clwyd Marina is greater than 22(metres)' 'it doesn't say maximum length of Clwyd Marina's results'	E1	Ignore any additional incorrect or spurious statements Allow 'Can't tell' with a reason, e.g. 'no raw data' 'don't know this information' 'doesn't show anywhere the biggest yacht in Clwyd Marina' 'we are only given some of the lengths of the yachts in the marinas' 'doesn't show Clwyd Marina's results' 'not specified' 'not specific' 'range not given for the Clwyd Marina (so can't identify the longest yacht)' Do not accept, e.g. 'don't know how many yachts in the marinas' 'not mentioned for either marina'

8(a) $\sqrt{\frac{25}{\pi}}$ or $\frac{5}{\sqrt{\pi}}$ or $\frac{\sqrt{25}}{\sqrt{\pi}}$ or equivalent	B2	ISW Accept √(25 ÷ π) or 5 ÷ √π or √25 ÷ √π For B1 accept π given as 3.1(4...) B1 for sight of any of the following: • π × radius^2 = 25 • r^2 = 25 / π • πr^2 = 25 • √25 / π • √25 ÷ π • 5/π
8(b)(i) 500 × 60 ÷ 4 or equivalent 7500 (cm^3 per minute)	M1 A1	May be seen in stages Answer given within the statement takes precedence
8(b)(ii) 500 ÷ (2 × 25) or equivalent 10 (cm)	M1 A1	May be seen in stages