GCSE MARKING SCHEME

AUTUMN 2022

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

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 2: Intermediate Tier	Mark	Comments
1(a) **Use** of 1 million as 1 000 000	B1	May be seen at any stage of working or implied by a correct answer Accept from sight of 2.2 million written as 2 200 000 Allow as implied from one of the following: • sight of an appropriate stage of working, e.g. 1% as 22 000 or 10% as 220 000 or 50% as 1 100 000 • an answer of 40 000 provided not from 0.2 × 2 million
0.02 × 2.2 (× 1 000 000) or (1 000 000 ×) 2.2 ÷ 50 or equivalent	M1	The method must be for the intention of finding 2% of 2.2 million, not any other percentage May be implied, from a full method, from sight of • 0.02 × 'digits 22 with place value error' • when working not shown, only non-zero digits of 44 in their answers Award M0 for 1.02 × 2.2 or 0.98 × 2.2 or 0.2 × 2.2
(£) 44 000 or (£) 44,000	A1	CAO. Answer space takes precedence Do not accept (£)0.044 (million) or 44**.**000 (A0) unless 44000 seen in working (A1)
1(b)(i) $\frac{115}{360}$	B1	
1(b)(ii) Gold 20° ±2°	B1	Check the diagram
1800 × $\frac{20\ (\pm2)}{360}$ or 5 × (20 (±2)) or equivalent	M1	Also implies previous B1 FT for any value used for '20' provided ≠180° and < 360°) for M1 only (including use of 160°)
100 (gold medals)	A1	A correct answer from using 20°±2° in the inclusive range 90 to 110 (gold medals), not from premature approximation (20/360 = 0.05, then 0.05 × 1800 = 90 B1 M1 A0)

2(a)			Incorrect unit of money is penalised – 1 once only on the first occurrence, by withholding an A or B mark
(Gas usage 21640 – 21345 =) 295 (kWh)		B1	
(Cost of gas excluding VAT) 295 × 7.2 or 295 × 0.072		M1	FT 'their 21640 – 21345' for M1 and possible A1 FT 'their number of units' including use of 21640 or 21345 or 21640 + 21345 for M1 but A0 Treat '× 0.72' as incorrect units, allow M1 but A0
2124(p) or (£)21.24		A1	
(Cost of gas including VAT) 2230(.2p) or (£)22.30(2)		B2	FT 'their cost of gas excluding VAT', accepting rounding or truncation to a penny B1 for one of the following: • (Cost of gas including VAT) 21(.)24 × 1.05 • (VAT) 106(.2p) or (£)1.06(2)
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.
2(b) 13.2 × 7 + 12.2 + 12.4 (= 117)		M2	M1 for sight of one of the following: • 13.2 × 7 or equivalent • 92.4 • a sum shown with a given total of 92 to 93 inclusive for 7 possible temperatures
÷ 9		m1	FT from M2 or from 12.2 + 12.4 + 'their sum with a total of 92 to 93 inclusive for 7 possible temperatures
13 (°C)		A1	CAO from 117 ÷ 9 Answer space takes precedence

2(c)
    a = 98(°)
    b = 63(°)
    c = 117(°)
		B1
		B1
		B1
			Answer space takes precedence
			
			FT 180 – 'their b' provided 'their b' ≠ 90° or ≠ 180°

3(a) Reasonable explanation, e.g. 'no one spent longer than 80 minutes training' '1 hour 25 minutes is more than 80 minutes'	E1	Allow, e.g. 'graph only goes up to 80 (minutes)' 'only shows to 1 hour 20 minutes' 'doesn't show above 80 minutes' 'the graph doesn't extend that much' 'the bar doesn't go up to 1 hour 25 minutes' 'the bar doesn't go up to 85 minutes' 'no one spent 1 hour 25 minutes in the gym' 'the maximum he could have spent was 1 hour 20 minutes' '85 minutes was not recorded' 'goes no later than 1 hour 20 minutes' Do not accept, e.g. 'the graph only gives 20 minute time groups (slots)' 'because in a frequency graph there is no way to know who is Freddie' 'he spent 1 hour 20 minutes in the gym' 'he spent an hour in the gym' 'the graph shows he didn't spend 1 hour 25 minutes in the gym' '1 hour 25 minutes is 85 minutes'
3(b) 14	B1	
3(c) 38	B1	
3(d) (Total number of men) 14 + 22 + 48 + 16 OR (Total number of women) 12 + 26 + 54 + 22 (Total men) 100 AND (Total women) 114 Method considering proportions, e.g. sight of any of: $\bullet$ $\dfrac{48}{100}$ AND $\dfrac{54}{114}$ $\bullet$ 48% of 114 $\bullet$ $\dfrac{54}{114}$ of 100 'False' unambiguously selected or implied **and** accurate appropriate calculations to justify choice of 'False', e.g. $\bullet$ 48% **and** 47(.3...)% or 47.4% $\bullet$ 0.48 **and** 0.47(3...) $\bullet$ (48% of 114 =) 54.7(2) **and** 54 (women)	M1 A2 M1 A1	Check the graphs for working FT 'their 12 + 26' from (c), i.e. 'their 38' + 54 + 22 A1 for either total correct FT 'their 48, 100, 54, and 114' providing at least two of them are correct and 'their total for men 100' ≠ 'their total for women 114' Allow 'True' if justified by correct calculations from their 4 values.

4(a) (Time difference) 5 hours 17:40 + 9 hours 15 minutes + 5 hours	B1 M1	Seen or implied FT adding 'their 5 hours', provided 'their 5 hours' ≠ 0 or negative May be seen in stages
Tuesday 07(:)55 or Tuesday (0)7(:)55 a.m.	A2	Answer space takes precedence unless unambiguously time in the morning from working A1 for the correct time, 07(:)55 or (0)7(:)55 a.m. or 'Tuesday 7(:)55' or 'Tuesday (0)7(:)55 p.m.' Special cases and/or implied 5 hours: provided not from incorrect working <table><tr><td>Monday 21:55 (p.m.)</td><td>B1 SC1</td></tr><tr><td>Monday (0)9(:)55 p.m.</td><td>B1 SC1</td></tr><tr><td>Monday (0)9(:)55</td><td>B1</td></tr><tr><td colspan="2" align="center">If no marks:</td></tr><tr><td>Tuesday (0)2(:)55</td><td>SC1</td></tr><tr><td>Tuesday (0)2(:)55 a.m.</td><td>SC1</td></tr></table> No marks for Monday (0)9(:)55 a.m. or Tuesday 2(:)55 p.m.
4(b)(i) (Time for remaining 60 miles is) 60 ÷ 40 1 hour 30 minutes or 1.5 (hours) or 90 (minutes)	M1 A1	Mark final answer, ignore continuation to give the total time, 2.5 hours If units are given they must be correct A0 for 1.3(0) (hours) or 1 30 (hours) or 1:30 (hours) or 1 hour 5 minutes
4(b)(ii) $\dfrac{80}{1(hrs) + 1.5(hrs)}$ or $\dfrac{80}{60 (mins) + 90 (mins)}$ $\dfrac{80}{2.5}$ or $\dfrac{80}{150} \times 60$ 32 (mph)	M1 m1 A1	FT from (b)(i) the final answer for 'their time' Within appropriate calculation allow • sight of 30 + 60 for 90 (mins) • with incorrect notation for 1.5 hours including as 1.3 Time notation must be correct Only FT if 'their time' from (b)(i) is not a whole number of hours CAO, not from incorrect working Answer space takes precedence

5(a) (Tax at 22%) 0.22 × 15000 or 0.22 × (25000 – 10000) or equivalent	M2	Ignore £ for € throughout M1 for appropriate sight of 25000 – 10000 (= €15000)	
(Tax at 35%) 0.35 × 3000 or 0.35 × (28000 – 25000) or equivalent	M2	M1 for 28000 – 25000 (= €3000)	
(Total tax due 3300 + 1050 =) 4350 (euros)	A2	CAO A1 for sight of 3300 (euros) or 1050 (euros)	
(Tax still owed 4350 – 3600 =) 750 (euros)	B1	FT for positive answers only, 'their derived 4350' – 3600, provided 3300 + ... or ... + 1050 seen, i.e. sum of two amounts with at least one amount correct If no marks, for special cases award one of the following:	

(0.22 × (28000 – 3600 – 10000) =) (0.22 × (24400 – 10000) =) (0.22 × 14400 =) (€) 3168	SC2
0.22 × (28000 – 3600 – 10000) or 0.22 × (24400 – 10000) or 0.22 × 14400	SC1

5(b) 3600 ÷ 1.11 (£) 3243.24	M1 A1	Answer space takes precedence Sight of (£) 3243 or 3243.2(4324....) implies M1
6(a) (Direct² =) 200² + 350² Direct² = 162500 or (Direct =) √162500	M1 A1	
(Direct =) 403(.11... m) or 50√65 (m) or √162500 (m)	A1	FT from M1 for the correctly evaluated square root of 'their 162500' provided 'their answer' > 350 (m) May be implied in further working Mark final answer or the answer they go on to use, but then FT

(Extra distance =)   200 + 350 – 403(.1...)
   or 200 + 350 – 50√65 or 200 + 350 – √162500
 	
        146.8(87....m) or 146.9(m) or 147(m)
	M1
	
	A1
		FT 'their derived 403(.11…)' > 350 and from an
		attempt to use Pythagoras' Theorem

6(b)(i) Selects or unambiguously implies 'No' with a reason, e.g. 'the median is in group >200m to 1000m (and he lives 200m away)', 'median is more than 200m away (but Ronnie is 200m away)'	E1	Needs to compare 200(m) with median >200(m) The 200(m) can be implied from selecting 'No' Ignore additional spurious statements Allow 'No' with a reason, e.g. 'Ronnie's distance is in the first group, the median is in the second group' 'Ronnie only travels 200m which is less than the median (distance)' 'because the median distance travelled is between 200m and 1000m' 'Ronnie doesn't travel the distance of the 17.5(th) person' 'Ronnie doesn't travel the distance of the 17(th) (or 18th) person' 'the median 17.5(th)' 'the median 17(th) (or 18(th))' 'he only walks 200m when the (median) distance is higher' 'he only walks 200m which is less than the median' 'can't estimate exact number from the group 200< d ≤ 1000' 'the median **could** be 880' '9 less than half of 35' '26 students walk further than him' Do not accept 'No' with a reason e.g. 'Ronnie's distance is in the first group' 'the median **is** 250m'
6(b)(ii) Midpoints 150, 600, 2000, 5000 150×9 + 600×10 + 2000×15 + 5000×1 (= 1350 + 6000 + 30000 + 5000 = 42350 m) ÷ 35 1210 (m)	B1 M1 m1 A1	Check the table Sight of 7750 implies correct midpoints FT 'their midpoints' provided at least 3 are within or at the bounds of the appropriate groups Answer space takes precedence
6(c) (140 ÷ 7 =) 20 or 140 ÷ 20 = 7 or 7 × 20 = 140 <table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>**2**</td><td>**22**</td><td>**42**</td><td>**62**</td><td>**82**</td><td>**102**</td><td>**122**</td></tr></table>	B1 B1	May be implied by any of the following: • consistent position patterns + 20 indicated for at least 4 consecutive positions e.g. (2,) 20, 40, 60, 80, 100, 120 • sight of 22 for student 2 with no further working or entries CAO

7(a) $4500 \times (1 - 0.2(0)) \times (1 - 0.14)^9$ or $4500 \times 0.8(0) \times 0.86^9$ or equivalent	M2	For M2, do not ignore any additional years considered, unless 10 years selected or implied in later working M1 for equivalent of one of the following (which may be embedded in other working): • $4500 \times (1 - 0.2(0))$ (= 3600) • $4500 \times 0.8(0)$ (= 3600) • $4500 \times (1 - 0.14)^9$ (= 1157.97...) • 4500×0.86^9 (= 1157.97...)
An answer in the range (£)926.35 to (£)926.40	A1	An answer for 10 years (not beyond) must be selected Allow an answer of (£)926 provided not from rounding an amount outside the range given Award M1, SC1 for an answer $(4500 \times 0.8 \times 0.86^{10} =)$ (£)796.68(5....) or (£)796.69 or (£)796.70 or (£)797
7(b) $100 \times 750 \div 125$ or $100 \times \dfrac{750}{125}$ or equivalent	M1	
(£) 600	A1	Answer space takes precedence
7(c) Sight of appropriate 80 (cm) (height of triangle)	 B1	Accept equivalents using the sine rule throughout '½ width' may be referred to by any unknown Check if indicated on the diagram
(½ width =) $\dfrac{80}{\tan 33°}$ or (½ width =) $80 \times \tan(90° - 33°)$	M2	(= 123.189... cm or 123.2 cm) FT 'their 80' provided ≤ 120 and ≠ 90 M1 for sight of $\tan 33° = \dfrac{80}{½ \text{ width}}$ or $\tan(90° - 33°) = \dfrac{½\text{width}}{80}$
$\times 2$	m1	FT provided at least M1 previously awarded, i.e. for intention to double 'their ½ width'
(Width of garage is) 246(cm) to 246.4(cm)	A1	CAO. ISW
7(d) (Maximum space =) $555 - 395 - 70$ or $550 - 400 + 2 \times 5 - 70$ or equivalent	M2	Check the diagram M1 for any of the following: • **use** of 550 < 'their 555' ≤ 560 AND 390 ≤ 'their 395' < 400 • for sight of 555 and 395 • for sight of $550 - 400 + 2 \times 5$
90 (cm)	A1	CAO Award M1 and SC1 for an answer of $(555 - 395 =)$ 160 (cm)

8(a) (Population in 1964) $\dfrac{100 + 682}{100} \times 30000$ or 7.82×30000 or $30000 + 30000 \times \dfrac{682}{100}$ or equivalent		M1	(= 234600 people) *M0 for* *6.82 × 30000 (= 204600) or* *1.682 × 30000 (= 50460)*
(Population in 2014) $\dfrac{100 + 20}{100} \times 234600$ or 1.2×234600		M1	FT 'their derived 234600' including 1.2 × 204600 (= 245520) 1.2 × 50460 (= 60552)
281520 (people)		A1	CAO
8(b) 287 106 ÷ 432		M1	
660 (people per km²)		A2	A1 for sight of 664.597…. rounded or truncated
8(c) 1442 × 1000 ÷ 1 000 000		M1	
1.4(42 g/cm³)		A1	Mark final answer Allow M1 A1 for 1442 ÷ 1000 = 1.4(42) Do not accept from incorrect working, e.g. M0 A0 if 1.442 seen with an incorrect statement, e.g. • "1 g = 1000 kg" • "g to kg is ÷ 1000"