



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.

<p>2(a)</p> <p>(Gas usage $21640 - 21345 =$) 295 (kWh)</p> <p>(Cost of gas excluding VAT) 295×7.2 or 295×0.072</p> <p>2124(p) or (£)21.24</p> <p>(Cost of gas including VAT) 2230(.2p) or (£)22.30(2)</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>B2</p>	<p><u>Incorrect unit of money is penalised – 1 once only on the first occurrence, by withholding an A or B mark</u></p> <p>FT 'their 21640 – 21345' for M1 and possible A1</p> <p>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</p> <p>FT 'their cost of gas excluding VAT', accepting rounding or truncation to a penny</p> <p>B1 for one of the following:</p> <ul style="list-style-type: none"> (Cost of gas including VAT) $21(.)24 \times 1.05$ (VAT) 106(.2p) or (£)1.06(2)
<p>Organisation and communication</p> <p>Writing</p>	<p>OC1</p> <p>W1</p>	<p>For OC1, candidates will be expected to:</p> <ul style="list-style-type: none"> 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 <p>For W1, candidates will be expected to:</p> <ul style="list-style-type: none"> 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.
<p>2(b) $13.2 \times 7 + 12.2 + 12.4$ (= 117)</p> <p>$\div 9$</p> <p>13 (°C)</p>	<p>M2</p> <p>m1</p> <p>A1</p>	<p>M1 for sight of one of the following:</p> <ul style="list-style-type: none"> 13.2×7 or equivalent 92.4 a sum shown with a given total of 92 to 93 inclusive for 7 possible temperatures <p>FT from M2 or from $12.2 + 12.4 +$ 'their sum with a total of 92 to 93 inclusive for 7 possible temperatures</p> <p>CAO from $117 \div 9$ Answer space takes precedence</p>
<p>2(c)</p> <p>a = 98(°) b = 63(°) c = 117(°)</p>	<p>B1</p> <p>B1</p> <p>B1</p>	<p>Answer space takes precedence</p> <p>FT 180 – 'their b' provided 'their b' $\neq 90^\circ$ or $\neq 180^\circ$</p>

<p>3(a) Reasonable explanation, e.g. 'no one spent longer than 80 minutes training' '1 hour 25 minutes is more than 80 minutes'</p>	E1	<p>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'</p> <p>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'</p>
3(b) 14	B1	
3(c) 38	B1	
<p>3(d) (Total number of men) $14 + 22 + 48 + 16$ OR (Total number of women) $12 + 26 + 54 + 22$</p> <p>(Total men) 100 AND (Total women) 114</p> <p>Method considering proportions, e.g. sight of any of:</p> <ul style="list-style-type: none"> $\frac{48}{100}$ AND $\frac{54}{114}$ 48% of 114 $\frac{54}{114}$ of 100 <p>'False' unambiguously selected or implied and accurate appropriate calculations to justify choice of 'False', e.g.</p> <ul style="list-style-type: none"> 48% and 47(.3...) % or 47.4% 0.48 and 0.47(3...) (48% of 114 =) 54.7(2) and 54 (women) 	<p>M1</p> <p>A2</p> <p>M1</p> <p>A1</p>	<p>Check the graphs for working FT 'their 12 + 26' from (c), i.e. 'their 38' + 54 + 22</p> <p>A1 for either total correct</p> <p>FT 'their 48, 100, 54, and 114' providing at least two of them are correct and 'their total for men 100' \neq 'their total for women 114'</p> <p>Allow 'True' if justified by correct calculations from their 4 values.</p>

4(a) (Time difference) 5 hours 17:40 + 9 hours 15 minutes + 5 hours Tuesday 07(:)55 or Tuesday (0)7(:)55 a.m.	B1 M1 A2	Seen or implied FT adding 'their 5 hours', provided 'their 5 hours' ≠ 0 or negative May be seen in stages 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.' <u>Special cases and/or implied 5 hours:</u> 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"><u>If no marks:</u></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.	Monday 21:55 (p.m.)	B1 SC1	Monday (0)9(:)55 p.m.	B1 SC1	Monday (0)9(:)55	B1	<u>If no marks:</u>		Tuesday (0)2(:)55	SC1	Tuesday (0)2(:)55 a.m.	SC1
Monday 21:55 (p.m.)	B1 SC1													
Monday (0)9(:)55 p.m.	B1 SC1													
Monday (0)9(:)55	B1													
<u>If no marks:</u>														
Tuesday (0)2(:)55	SC1													
Tuesday (0)2(:)55 a.m.	SC1													
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) $\frac{80}{1(\text{hrs}) + 1.5(\text{hrs})} \quad \text{or} \quad \frac{80}{60(\text{mins}) + 90(\text{mins})}$ $\frac{80}{2.5} \quad \text{or} \quad \frac{80 \times 60}{150}$ 32 (mph)	M1 m1 A1	FT from (b)(i) the final answer for 'their time' Within appropriate calculation allow <ul style="list-style-type: none">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 $0.22 \times (25000 - 10000)$ or equivalent (Tax at 35%) 0.35×3000 or $0.35 \times (28000 - 25000)$ or equivalent (Total tax due $3300 + 1050 =$) 4350 (euros) (Tax still owed $4350 - 3600 =$) 750 (euros)	M2 M2 A2 B1	Ignore £ for € throughout M1 for appropriate sight of 25000 – 10000 (= €15000) M1 for 28000 – 25000 (= €3000) CAO A1 for sight of 3300 (euros) or 1050 (euros) 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 <u>If no marks, for special cases award one of the following:</u> <table><tr><td>$(0.22 \times (28000 - 3600 - 10000) =)$ $(0.22 \times (24400 - 10000) =)$ $(0.22 \times 14400 =)$ (€) 3168</td><td>SC2</td></tr><tr><td>$0.22 \times (28000 - 3600 - 10000)$ or $0.22 \times (24400 - 10000)$ or 0.22×14400</td><td>SC1</td></tr></table>	$(0.22 \times (28000 - 3600 - 10000) =)$ $(0.22 \times (24400 - 10000) =)$ $(0.22 \times 14400 =)$ (€) 3168	SC2	$0.22 \times (28000 - 3600 - 10000)$ or $0.22 \times (24400 - 10000)$ or 0.22×14400	SC1
$(0.22 \times (28000 - 3600 - 10000) =)$ $(0.22 \times (24400 - 10000) =)$ $(0.22 \times 14400 =)$ (€) 3168	SC2					
$0.22 \times (28000 - 3600 - 10000)$ or $0.22 \times (24400 - 10000)$ or 0.22×14400	SC1					
5(b) $3600 \div 1.11$ (£) 3243.24	M1 A1	Answer space takes precedence Sight of (£) 3243 or 3243.2(4324....) implies M1				
6(a) (Direct ² =) $200^2 + 350^2$ Direct ² = 162500 or (Direct =) $\sqrt{162500}$ (Direct =) 403(.11... m) or $50\sqrt{65}$ (m) or $\sqrt{162500}$ (m) (Extra distance =) $200 + 350 - 403(.1\dots)$ or $200 + 350 - 50\sqrt{65}$ or $200 + 350 - \sqrt{162500}$ 146.8(87...m) or 146.9(m) or 147(m)	M1 A1 A1 M1 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 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 18 th) 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>	1	2	3	4	5	6	7	2	22	42	62	82	102	122	B1 B1	May be implied by any of the following: <ul style="list-style-type: none">consistent position patterns + 20 indicated for at least 4 consecutive positions e.g. (2,) 20, 40, 60, 80, 100, 120sight of 22 for student 2 with no further working or entries CAO
1	2	3	4	5	6	7										
2	22	42	62	82	102	122										

<p>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</p> <p>An answer in the range (£)926.35 to (£)926.40</p>	<p>M2</p> <p>A1</p>	<p>For M2, do not ignore any additional years considered, unless 10 years selected or implied in later working</p> <p>M1 for equivalent of one of the following (which may be embedded in other working):</p> <ul style="list-style-type: none"> • $4500 \times (1 - 0.2(0))$ (= 3600) • $4500 \times 0.8(0)$ (= 3600) • $4500 \times (1 - 0.14)^9$ (= 1157.97...) • 4500×0.86^9 (= 1157.97...) <p>An answer for 10 years (not beyond) must be selected</p> <p>Allow an answer of (£)926 provided not from rounding an amount outside the range given</p> <p>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</p>
<p>7(b) $100 \times 750 \div 125$ or $100 \times \frac{750}{125}$ or equivalent</p> <p>(£) 600</p>	<p>M1</p> <p>A1</p>	<p>Answer space takes precedence</p>
<p>7(c)</p> <p>Sight of appropriate 80 (cm) (height of triangle)</p> <p>($\frac{1}{2}$ width =) $\frac{80}{\tan 33^\circ}$ or ($\frac{1}{2}$ width =) $80 \times \tan (90^\circ - 33^\circ)$</p> <p>$\times 2$</p> <p>(Width of garage is) 246(cm) to 246.4(cm)</p>	<p>B1</p> <p>M2</p> <p>m1</p> <p>A1</p>	<p>Accept equivalents using the sine rule throughout</p> <p>'$\frac{1}{2}$ width' may be referred to by any unknown</p> <p>Check if indicated on the diagram</p> <p>(= 123.189... cm or 123.2 cm)</p> <p>FT 'their 80' provided ≤ 120 and $\neq 90$</p> <p>M1 for sight of $\tan 33^\circ = \frac{80}{\frac{1}{2} \text{ width}}$ or $\tan (90^\circ - 33^\circ) = \frac{\frac{1}{2} \text{ width}}{80}$</p> <p>FT provided at least M1 previously awarded, i.e. for intention to double 'their $\frac{1}{2}$ width'</p> <p>CAO. ISW</p>
<p>7(d)</p> <p>(Maximum space =) $555 - 395 - 70$ or $550 - 400 + 2 \times 5 - 70$ or equivalent</p> <p>90 (cm)</p>	<p>M2</p> <p>A1</p>	<p>Check the diagram</p> <p>M1 for any of the following:</p> <ul style="list-style-type: none"> • use of $550 < \text{'their 555'} \leq 560$ AND $390 \leq \text{'their 395'} < 400$ • for sight of 555 and 395 • for sight of $550 - 400 + 2 \times 5$ <p>CAO</p> <p>Award M1 and SC1 for an answer of $(555 - 395 =)$ 160 (cm)</p>

<p>8(a) (Population in 1964)</p> $\frac{100 + 682}{100} \times 30000 \quad \text{or} \quad 7.82 \times 30000$ <p>or $30000 + 30000 \times \frac{682}{100}$ or equivalent</p> <p>(Population in 2014)</p> $\frac{100 + 20}{100} \times 234600 \quad \text{or} \quad 1.2 \times 234600$ <p style="text-align: right;">281520 (people)</p>	<p>M1</p> <p>M1</p> <p>A1</p>	<p>(= 234600 people)</p> <p><i>M0 for</i></p> <p><i>6.82 × 30000 (= 204600) or</i></p> <p><i>1.682 × 30000 (= 50460)</i></p> <p>FT 'their derived 234600' including</p> <p>$1.2 \times 204600 (= 245520)$</p> <p>$1.2 \times 50460 (= 60552)$</p> <p>CAO</p>
<p>8(b) $287\,106 \div 432$</p> <p style="text-align: right;">660 (people per km²)</p>	<p>M1</p> <p>A2</p>	<p>A1 for sight of 664.597.... rounded or truncated</p>
<p>8(c) $1442 \times 1000 \div 1\,000\,000$</p> <p style="text-align: right;">1.4(42 g/cm³)</p>	<p>M1</p> <p>A1</p>	<p>Mark final answer</p> <p>Allow M1 A1 for $1442 \div 1000 = 1.4(42)$</p> <p>Do not accept from incorrect working, e.g.</p> <p>M0 A0 if 1.442 seen with an incorrect statement, e.g.</p> <ul style="list-style-type: none"> • "1 g = 1000 kg" • "g to kg is $\div 1000$"