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# **GCSE MARKING SCHEME**

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**AUTUMN 2021**

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

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2021 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 2021 MARK SCHEME**

Unit 2: Intermediate Tier	Mark	Comments
1(a) 202.5 m <sup>2</sup>	B1	
1(b) 1215 m <sup>2</sup>	B1	
2(a) Number of units 620 Charge for units $620 \times (0.)18$ (£) 111.6(0) (Standing charge) (£ 18) Total charges (£) 129.6(0) VAT at 5% (£) 6.48 Amount to pay (£) 136.08	B1 M1 A1 B1 B1 B1	FT 'their 620', including if not a whole number Award for sight of digits 1116(0) Must be in pounds FT 'their 111.6(0)' + 18 correctly evaluated FT 5% of 'their 129.6(0)' correctly evaluated, allow rounded or truncated Allow for sight of (£) 136.08 in this box as implying (£) 6.48 FT provided at least one of the two previous B1 marks has been awarded

<p>2(b)</p> <p>2(b) Water interest <math>0.02 \times 234</math>  <b>AND</b> Gas interest <math>0.023 \times 120</math>  <b>AND</b> Loan interest <math>0.11 \times 45</math></p> <p>Water (£) 4.68  Gas (£) 2.76  Loan (£) 4.95</p> <p>Total interest (£) 12.39</p>	<p>M2</p> <p>A2</p> <p>A1</p>	<p><b>If an evaluation is given with incorrect units, penalise A mark -1 on the first occasion then FT</b></p> <p>Or equivalents  M1 for any 1 or 2 correct methods</p> <p>A1 for any 1 or 2 correct evaluations</p> <p>Mark final answer, unless clearly stated as total interest  FT for the sum of 3 amounts provided 2 of the amounts are correct</p>
<p>2(b) <u>Alternative method:</u>  Water payment <math>1.02 \times 234</math>  <b>AND</b> Gas payment <math>1.023 \times 120</math>  <b>AND</b> Loan payment <math>1.11 \times 45</math></p> <p>Water (£) 238.68  Gas (£) 122.76  Loan (£) 49.95</p> <p>Total interest (<math>£238.68 + £122.76 + £49.95</math>  <math>- £234 \quad - 120 \quad - 45 =</math>)  (£) 12.39</p>	<p>M2</p> <p>A2</p> <p>A1</p>	<p>Or equivalents  M1 for any 1 or 2 correct methods</p> <p>A1 for any 1 or 2 correct evaluations</p> <p>(= £411.39 – £399)  FT for the sum of 3 amounts – (234 + 120 + 45)  provided 2 of these 3 amounts are correct</p>
<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"> <li>• present their response in a structured way</li> <li>• explain to the reader what they are doing at each step of their response</li> <li>• lay out their explanations and working in a way that is clear and logical</li> <li>• write a conclusion that draws together their results and explains what their answer means</li> </ul> <p>For W1, candidates will be expected to:</p> <ul style="list-style-type: none"> <li>• show all their working</li> <li>• make few, if any, errors in spelling, punctuation and grammar</li> <li>• use correct mathematical form in their working</li> <li>• use appropriate terminology, units, etc.</li> </ul>
<p>3(a) (Mass of sugar =) <math>1920 \times 3 \div 16</math> or <math>\frac{3}{16} \times 1920</math>  360 (g)</p> <p>(Number of eggs = <math>360 \div 90 =</math>) 4</p> <p>(Mass of sultanas = <math>360 \div 90 \times 50 =</math>) 200 (g)</p>	<p>M1</p> <p>A1</p> <p>B1</p> <p>B1</p>	<p>Or <math>0.1875 \times 1920</math></p> <p>Do not accept from incorrect working  FT 'their derived 360' <math>\div 90</math>, rounded or truncated to a whole number of eggs</p> <p>FT 'their derived 360' <math>\div 90</math> or FT 'their 4' <math>\times 50</math> provided 'their 4' <math>\neq 1</math></p>
<p>3(b) <math>852 \times 2 \div 3</math> or <math>\frac{2}{3} \times 852</math>  568 (g)</p>	<p>M1</p> <p>A1</p>	<p>Mark final answer  Allow M1 A0 for sight of 568(g) followed by additional working, e.g. <math>852 - 568 = 284(g)</math></p>

<p>4(a) Perimeter (circumference of the circular table)  <math>\pi \times 1.5</math> or <math>2 \times \pi \times 0.75</math>  4.7(...m)</p> <p>Rectangular table perimeter 5.6 (m) <b>AND</b> the conclusion that rectangular perimeter is greater</p>	<p>M1 A1</p> <p>E1</p>	<p>5.6 (m) must be seen or implied by the difference between 5.6 (m) and 'their circumference'  FT depends on M1 previously awarded</p>															
<p>4(b) Circular table area <math>\pi \times (1.5 \div 2)^2</math>  1.76(... m<sup>2</sup>) or 1.77 (m<sup>2</sup>) or 1.8 (m<sup>2</sup>)</p> <p>Rectangular table area 1.6 (m<sup>2</sup>) <b>AND</b> the conclusion 'no' (the circular table area is greater)</p>	<p>M1</p> <p>A1</p> <p>E1</p>	<p>Allow an answer truncated to 1.7(m<sup>2</sup>)</p> <p>1.6 (m<sup>2</sup>) must be seen or implied by the difference between 1.6 (m<sup>2</sup>) and 'their area of circle'  <b>STRICT FT</b> from 'their conclusion in (a)' for the conclusion in (b), provided M1 previously awarded in (b)</p> <table border="1"> <thead> <tr> <th>Answers in (a)</th> <th>Answers in (b)</th> <th>Conclusion</th> </tr> </thead> <tbody> <tr> <td>rectangle &gt; circle</td> <td>rectangle &lt; circle</td> <td>no</td> </tr> <tr> <td>rectangle &lt; circle</td> <td>rectangle &lt; circle</td> <td>yes</td> </tr> <tr> <td>rectangle &gt; circle</td> <td>rectangle &gt; circle</td> <td>yes</td> </tr> <tr> <td>rectangle &lt; circle</td> <td>rectangle &gt; circle</td> <td>no</td> </tr> </tbody> </table> <p><i>If they match it is 'yes', if they don't it is 'no'</i>  <i>'Their conclusion' from (a) may be inferred</i>  If 'yes' or 'no' is not stated then it must be unambiguously implied</p> <p>If no marks, award SC1 for meeting all three of the following requirements:  <b>1.</b> <math>\pi \times 1.5^2 = 7(.0\dots m^2)</math> or <math>7.1(m^2)</math>  OR <math>\frac{1}{2} \times \pi \times 1.5^2 = 3.5(\dots m^2)</math>  <b>2.</b> Rectangular area 1.6 (m<sup>2</sup>)  OR implied by the difference between 1.6 (m<sup>2</sup>) and 'their area of circle'  <b>3.</b> Appropriate conclusion of 'yes' or 'no'</p>	Answers in (a)	Answers in (b)	Conclusion	rectangle > circle	rectangle < circle	no	rectangle < circle	rectangle < circle	yes	rectangle > circle	rectangle > circle	yes	rectangle < circle	rectangle > circle	no
Answers in (a)	Answers in (b)	Conclusion															
rectangle > circle	rectangle < circle	no															
rectangle < circle	rectangle < circle	yes															
rectangle > circle	rectangle > circle	yes															
rectangle < circle	rectangle > circle	no															
<p>5(a) <math>1000 \times 250 \div 28350</math>  or <math>250000 \div 28350</math>  or <math>250 \div 28.35(0)</math></p> <p>8.8(18...) (applications)</p>	<p>M2</p> <p>A1</p>	<p>M1 for sight of appropriate digits with division with incorrect place value of mass(es)  Do not allow for division inverted</p> <p>Do not FT from M1  Accept answers of 8 or 9 (applications) from correct working  Ignore the unit of the answer given as 'ounces'</p>															
<p>5(a) <u>Alternative method</u>  <math>28(.350) \times 9 = 255(.150)</math>  or <math>28(.350) \times 8.8 = 249(.480)</math></p> <p>8.8(18...) (applications)</p>	<p>M2</p> <p>A1</p>	<p>Or for use of a value between 8.8 and 9  M1 for <math>28(.350) \times 8 = 226(.800)</math>  <b>and possible</b>  M1 for <math>250(.000) - 226(.800) = 23200</math> (mg)  (which is &lt; 28350 mg)</p> <p>OR  M1 multiple of <math>28(.350) \times 9 = 255(.150)</math>  or <math>28(.350) \times 8.8 = 249(.480)</math> with incorrect place value of mass(es)</p> <p>Do not FT from M1  Accept answers of 8 or 9 (applications) from correct working  Ignore the unit of the answer given as 'ounces'</p> <p>Note: Sight of <math>28(.350) \times 8 = 226(.800)</math> <b>only</b> with an answer of 8 (applications) is awarded M1 A1</p>															



6(a)	1.04 m <sup>2</sup>	B1	
6(b)	Positive	B1	
6(c)	Garth's height 1.65 (m)	B2	<p>Accept 165 cm written in the answer space, but must state cm, allow 165 cm without the 'm' crossed out Allow B1 for 165 written in the answer space</p> <p>B1 Correct working, Ella's height 1.6(0 m) or 160 (cm) or Garth's area of skin 1.7 (m<sup>2</sup>). Allow this:</p> <ul style="list-style-type: none"> <li>• if any of the above values are given in the answer space provided the correct units are written, allowing without 'm' crossed out, or</li> <li>• for either point (1.6, 1.54) unambiguously labelled Ella or the point (1.65, 1.7) unambiguously labelled Garth on the graph</li> </ul>
6(d)	(Height) 1.18 × 1.5 or equivalent 1.77(m) (Area of skin) 1.9(m <sup>2</sup> )	M1 A1 A1	<p>CAO. Ignore any units given CAO. Ignore any units given</p>

<p>7(a) <math>37 + 34 + 20 + 28 + 21</math></p> <p style="text-align: center;">140 (students)</p>	<p>M1</p> <p>A1</p>	<p>Allow M1 for</p> <ul style="list-style-type: none"> <li>• any 4 of the 5 readings correct in a sum of 5 non-zero readings, or</li> <li>• for a total (<math>\neq 140</math> but) <math>140 \pm 2</math></li> <li>• total of 140 seen with further working with 'their' final answer <math>\neq 140</math></li> </ul> <p>Mark final answer</p>
<p>7(b) <span style="float: right;">5 to 10 seconds</span></p>	<p>B1</p>	
<p>7(c)</p> <p>10 (seconds) to 15 (seconds)</p>	<p>B2</p>	<p>Allow if considering the <math>0.5(n+1)</math>th term throughout</p> <p>FT 'their 140' provided 'their 140' &gt; 100 throughout</p> <p>Not from incorrect working</p> <p>Allow for an inclusive or exclusive range of times</p> <p>B1 for any of the following:</p> <ul style="list-style-type: none"> <li>• appropriate sight of <math>70</math> or <math>140 \div 2</math></li> <li>• the answer <math>12.5</math> seconds</li> </ul>
<p>7(d) Selects or unambiguously implies <b>'Yes'</b> with a reason, e.g. 'no students in group 30 to 35 seconds', 'last students started in 25 to 30 second range'</p>	<p>E1</p>	<p>Allow the term 'finished' as meaning 'finished starting the task', e.g. 'Yes' with 'no student finished after 30 seconds'</p> <p>Allow, 'yes' with a reason, e.g. 'all students started before 30 seconds', 'data stopped after 30 seconds', 'no students in the last group'</p> <p>Allow selection of 'Can't tell' with a reason based on thinking 30 seconds may be included in the group 25 to 30, so some students could have taken exactly 30 seconds to start and not started within 30 seconds, that is thinking 'within 30 seconds' does not include '30 seconds'</p> <p>Do not accept 'Yes' with a reason, e.g. 'no students after 27.5 seconds', 'all students between 27.5 and 32.5 seconds could start within 30 seconds'</p>
<p>7(e) <math>\frac{37}{140} (\times 100)</math> or <math>0.25 \times 140</math></p> <p>or <math>0.25 \times (37 + 34 + 20 + 28 + 21)</math></p> <p>or <math>\frac{37}{37 + 34 + 20 + 28 + 21} (\times 100)</math></p> <p>26(.42...%) or 35 (students) AND <b>'No'</b> indicated</p>	<p>M1</p> <p>A1</p>	<p>FT 'their derived 140' from (a) provided &gt;100 with numerator 37 or 'their 37' if seen in (a)</p> <p>Accept 0.26(...) only if 0.25 is seen</p>



<p>8. (To spend on \$) OR (Convert to \$)</p> $\begin{array}{ll} 13/20 \times 500 & 500 \times 1.36 \\ = (\pounds) 325 & = (\$) 680 \end{array}$ <p>(Buying \$) <math>13/20 \times 500 \times 1.36</math> (\$) 442</p> <p>(As lowest note \$5 can only buy) (\$) 440</p> <p>(This will cost) <math>440 \div 1.36</math>  or <math>13/20 \times 500 - (442 - 440) \div 1.36</math>  or <math>325 - 2 \div 1.36</math></p> <p>(£) 323.53 or (£)323.52(9...)</p> <p>(Money left to buy euros <math>500 - 323.53</math>) (£)176.47</p>	<p>M1 A1</p> <p>M1 A1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>A1</p>	<p>May be embedded in further calculation</p> <p>FT 'their incorrectly evaluated <math>13/20 \times 500</math>'</p> <p>Allow equivalent given unambiguously in possible notes  FT 'their derived 442' rounded down to the nearest multiple of 5  If (\$)442 in the answer space, only award if clearly showing 'buying \$440'</p> <p>FT 'their derived 442' and 'their derived 440' provided it is a multiple of 5</p> <p>FT provided to the nearest penny  Do not FT from incorrect rounding of 'their £323.52(9...)'  Note: <math>500 - 323.52 = (\pounds)176.48</math> is A0</p> <p><i>If unambiguous and clear correct response seen in working, ignore a slip in transferring (£)176.47 to the answer space.  Ignore answers reversed in the answer space</i></p>
<p>8. <u>Alternative method:</u></p> <p>(To spend on \$) OR (Convert to \$)</p> $\begin{array}{ll} 13/20 \times 500 & 500 \times 1.36 \\ = (\pounds) 325 & = (\$) 680 \end{array}$ <p>(Buying \$) <math>13/20 \times 500 \times 1.36</math> (\$) 442</p> <p>(As lowest note \$5 can only buy) (\$) 440</p> <p>(\$2 is worth) <math>(442 - 440) \div 1.36</math> or <math>2 \div 1.36</math>  (£) 1.47(05..)</p> <p>(Money left to buy euros <math>500 - 325 + 1.47</math>) (£)176.47</p>	<p>M1 A1</p> <p>M1 A1</p> <p>B1</p> <p>M1 A1</p> <p>A1</p>	<p>May be embedded in further calculation</p> <p>FT 'their incorrectly evaluated <math>13/20 \times 500</math>'</p> <p>Allow equivalent given unambiguously in possible notes  FT 'their derived 442' rounded down to the nearest multiple of 5  May be implied by use of \$2</p> <p>FT 'their derived 442' and 'their derived 440' provided it is a multiple of 5</p> <p>FT provided to the nearest penny  Do not FT from incorrect rounding of 'their £1.47(05...)'</p> <p><i>If unambiguous and clear correct response seen in working, ignore a slip in transferring (£)176.47 to the answer space.  Ignore answers reversed in the answer space</i></p>



<p>10(a) (Length<sup>2</sup> =) 4.2<sup>2</sup> + 1.1<sup>2</sup></p> <p>Length<sup>2</sup> = 18.85 or (Length =) <math>\sqrt{18.85}</math></p> <p>(Length) 4.3(416...m)</p> <p>Selects 4.4 m length</p> <p>(Number of panels needed is ) 7 (panels)</p> <p>(Cost of the shelter roof £24 × 7) (£) 168</p>	<p>M1</p> <p>A1</p> <p>A1</p> <p>A1</p> <p>B1</p> <p>B1</p>	<p>Or alternative <b>full</b> method</p> <p>FT from M1, A0 for the correctly evaluated square root of 'their 18.85' provided 'their answer' &gt; 4.2 (m) If 4.3(4...) not seen, this A1 may be implied by the sight of choice of panel 4.4(m) Do not accept an unsupported answer of 4.3 (m)</p> <p>May be implied by use of £24 in further working FT where possible the length immediately &gt; 'their 4.3416...' provided M1 previously awarded and 'their 4.3416...' has not been rounded down or truncated to give a different length from the table</p> <p>Allow B1 for 8 (panels) (thinking overlap may be as much as approximately <math>\frac{1}{4}</math> of the width of a panel) Do not award B1 for 7 or 8 panels if incorrect logic from misinterpretation seen, e.g. working with area 26.05m<sup>2</sup> so buy 7 of the 4.1m panels with area 28.7m<sup>2</sup></p> <p>FT provided B1 previously awarded FT 'their derived 4.4' provided &gt; 4.2 m</p> <table border="1"> <tr><td>4.3 m</td><td>23 × 7</td><td>(£)161</td></tr> <tr><td>4.5 m</td><td>25 × 7</td><td>(£)175</td></tr> <tr><td>4.6 m</td><td>26 × 7</td><td>(£)182</td></tr> </table> <p>Allow for 8 panels:</p> <table border="1"> <tr><td>4.3 m</td><td>23 × 8</td><td>(£)184</td></tr> <tr><td><b>4.4 m</b></td><td>24 × 8</td><td><b>(£)192</b></td></tr> <tr><td>4.5 m</td><td>25 × 8</td><td>(£)200</td></tr> <tr><td>4.6 m</td><td>26 × 8</td><td>(£)208</td></tr> </table>	4.3 m	23 × 7	(£)161	4.5 m	25 × 7	(£)175	4.6 m	26 × 7	(£)182	4.3 m	23 × 8	(£)184	<b>4.4 m</b>	24 × 8	<b>(£)192</b>	4.5 m	25 × 8	(£)200	4.6 m	26 × 8	(£)208
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<p>10(b) <math>\tan</math> angle between roof and wall = <math>\frac{4.2}{1.1}</math></p> <p>75.3(°)</p>	<p>M1</p> <p>A3</p>	<p>Or alternative <b>full</b> method</p> <p>Ignore incorrect units Must be to 3 significant figures A2 for 75.32(3...°) or 75(°) OR A1 for <math>\tan^{-1} \frac{4.2}{1.1}</math></p> <p>From an alternative full method, award A2 maximum for 'their accurate answer' with errors due to rounding or truncation in stages of working, if the final answer is given correct to 3 significant figures, or A1 otherwise</p> <p><i>Note:</i> <i>Use of <math>\tan</math> angle between roof and wall = 1.1/4.2 is awarded M0 A0</i></p> <p><i>If no marks, award SC1 for 'their derived angle' given correctly to 3 significant figures (<math>\tan^{-1} 1.1/4.2 = 14.7(°)</math> to 3 significant figures)</i></p>
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