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# **GCSE MARKING SCHEME**

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**AUTUMN 2019**

**GCSE  
MATHEMATICS – UNIT 2  
INTERMEDIATE TIER  
3300U40-1**

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2019 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**

**AUTUMN 2019 MARK SCHEME**

<b>GCSE Mathematics Unit 2: Intermediate Tier</b>	<b>Mark</b>	<b>Comments</b>
1.(a) $0.125 \times 1176$ or equivalent. = 147 ISW	M1 A1	
1.(b) 190	B2	If further incorrect work shown e.g. '190 = 19' then allow B1 only. B1 for sight of 191 or 192 or 191.7(.....) or 190.0
1.(c) 4.7	B2	If further incorrect work shown e.g. '4.7 = 5' then allow B1 only. B1 for sight of 4.6 or 4.68(.....) or 4.70
2. $f = 73(^{\circ})$ $g = 128 - 73$ = 55(^{\circ})	B1 M1 A1	F.T. 128 - 'their f'.
<u>Alternative method</u> $f = 73(^{\circ})$ $g = 180 - (180 - 128) - 73$ = 55(^{\circ})	B1 M1 A1	FT 'their f'.
3. $\begin{array}{r} (1) \ 5 \ (9) \\ (7) \ (8) \ 2 \\ \hline 9 \ (4) \ (1) \end{array}$	B3	B1 for each. No F.T.
4.(a) $\frac{1}{12}$	B1	
4.(b) D	B1	
4.(c) $\frac{1}{3}$	B1	

<p>5. Sight of <math>6 \cdot 25</math> (hrs) OR <math>375</math> (min)  (Planning <math>\Rightarrow</math>) <math>\frac{2}{5} \times 6 \cdot 25</math> OR <math>\frac{2}{5} \times 375</math>    <math>= 2 \cdot 5</math> (hrs) OR <math>150</math> (min)</p> <p>(Remainder of work <math>= 6 \cdot 25 - 2 \cdot 5</math> OR <math>375 - 150 =</math>)  <math>3 \cdot 75</math> (hrs) OR <math>225</math> (min)  <math>= 3</math> hours <math>45</math> minutes</p>	<p>B1 M1  A1   B1 B1</p>	<p>F.T. 'their time' in hours or in minutes.  May be seen in parts (<math>1/5^{\text{th}}</math> and then <math>2/5^{\text{ths}}</math>)</p> <p>[Note: <math>2/5 \times 6 \cdot 15</math> OR <math>2/5 \times 615</math> is B0M1(FT)  <math>= 2 \cdot 46</math>(hrs) OR <math>246</math>(min) A1(FT)  BUT A0 if <math>2 \cdot 46</math> then used as as 2h 46m ]</p> <p>F.T. 'their derived times' using same units.</p> <p>F.T. correct conversion of 'their times', correct to the nearest minute (rounded or truncated), if of equivalent difficulty.  Allow unambiguous indication of units.</p>
<p><u>Alternative method 1</u>  Sight of <math>6 \cdot 25</math> (hrs) OR <math>375</math> (min)  (Remaining work takes) <math>3/5</math> of time  <math>= 3/5 \times 6 \cdot 25</math> OR <math>3/5 \times 375</math>  <math>= 3 \cdot 75</math> (hrs) OR <math>225</math> (min)  <math>= 3</math> hours <math>45</math> minutes</p>	<p>B1 B1 M1 A1 B1</p>	<p>F.T. 'their time' in hours or in minutes.</p> <p>F.T. correct conversion of 'their times', correct to the nearest minute (rounded or truncated), if of equivalent difficulty.  Allow unambiguous indication of units.</p>
<p><u>Alternative method 2</u>  (Planning <math>\Rightarrow</math>) <math>\frac{2}{5} \times 6</math> AND <math>\frac{2}{5} \times 15</math>  <math>= 2 \cdot 4</math>(hrs) AND <math>6</math>(min)  <math>= 2</math>hrs <math>30</math>min</p> <p>(Remainder of work <math>\Rightarrow</math>) <math>6</math>(hr) <math>15</math>(min) <math>- 2</math>(hrs) <math>30</math>(min)  <math>= 3</math> hours <math>45</math> minutes</p>	<p>M1  A1 A1 M1 A1</p>	<p><math>2 \cdot 4</math> hrs may be given as 2hrs 24min.  C.A.O.  F.T. 'their derived planning time' <u>in hours and min.</u></p>
<p><u>Alternative method 3</u>  (Remaining work takes) <math>3/5</math> of time  <math>= \frac{3}{5} \times 6</math> AND <math>\frac{3}{5} \times 15</math>  <math>= 3 \cdot 6</math>(hrs) AND <math>9</math>(min)  <math>= 3</math>hrs <math>36</math>min <math>+ 9</math>(min)  <math>= 3</math> hours <math>45</math> minutes</p>	<p>B1 M1  A1 M1 A1</p>	<p><math>3 \cdot 6</math> hrs may be given as 3hrs 36min.  F.T. 'their derived times' <u>in hours and min.</u></p>
<p>OCW Organisation and Communication.</p> <p>Accuracy of writing.</p>	<p>OC1          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 explanation 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>

6.(a)	Attempt at $323 + 217$ AND $122 + 58$  $= 3 : 1$	B1 B2	Allow for an attempt at adding the correct two pairs of numbers. B1(plus previousB1) for a ratio equivalent to 3 : 1 e.g. 540 : 180. Allow B1B1 for a final answer of 1 : 3.  If no marks gained allow SC1 for a final answer of 89 : 55 OR 55 : 89 (Llandudno : Aberystwyth ratio.)
6.(b)	$\frac{445}{720}$ ISW $\left(\frac{89}{144}\right)$	B2	0.618(...) or 0.62 or 61.8(..)% or 62% implies B2. B1 for $x/720$ if $x < 720$ . B1 for $445/y$ if $y > 445$ . Allow B1 for 0.61 or 61%. Penalise -1 for incorrect notation, e.g. 445 out of 720.
7.	Both points in correct position.	B4	<i>Tolerance of <math>\pm 2^\circ</math> and <math>\pm 2mm</math></i> Allow 'end of line' to indicate position(s) of point(s) P. B3 for one point in correct position. B2 for one or two point(s) within 'distance' tolerance. B1 for one or two point(s) within 'angle' tolerance.  If no marks gained allow SC1 for sight of 8 cm ( $\equiv$ ) 400m OR 2cm ( $\equiv$ ) 100m OR 1 cm ( $\equiv$ ) 50m OR (scale =) 1 : 50
8.(a)(i)	(x =) 36	B1	Accept embedded answer unless contradicted by $x \neq 36$ . Mark final answer.
8.(a)(ii)	$12x + 8 = 12$ OR $3x + 2 = 3$ $12x = 4$ OR $3x = 1$ $x = \frac{4}{12}$ OR $x = \frac{1}{3}$	B1 B1 B1	F.T. until 2 <sup>nd</sup> error. Adding 'unlike terms' eg $12x + 8 = 20x$ or $3x + 2 = 5x$ to be taken as two errors.  Mark final answer. Allow 0.33(33..) A final answer of 0.3 is (B1B1)B0.
8(b)(i)	$7(2a + 3)$	B1	
8(b)(ii)	$f(f - 1)$	B1	
9.	$a = 123^\circ$ $b = 57^\circ$ $c = 74^\circ$	B1 B1 B1	OR F.T. $180 - a$ .
10.	One correct evaluation $3 \leq x \leq 4$ 2 correct evaluations $3.55 \leq x \leq 3.75$ , one $< 37$ , one $> 37$ . 2 correct evaluations $3.55 \leq x \leq 3.65$ , one $< 37$ , one $> 37$ .  $x = 3.6$	B1 B1 M1 A1	<i>Correct evaluation regarded as enough to identify if <math>&lt; 37</math> or <math>&gt; 37</math>. If evaluations not seen accept 'too high' or 'too low'.</i> <i>Look out for testing <math>x^3 - 3x - 37 = 0</math></i> $\underline{x}$ $\underline{x^3 - 3x}$  3                              18 3.1                          20.491 3.2                          23.168 3.3                          26.037 3.4                          29.104 3.5                          32.375                      3.55              34.08.... <b>3.6</b> <b>35.856</b> <b>3.65</b> <b>37.67...</b> <b>3.7</b> <b>39.553</b> 3.75              41.48... 3.8                          43.472 3.9                          47.619 4                              52

<p>11.(a)</p> <table border="1" data-bbox="153 255 675 376"> <tr> <td>Throws</td> <td>20</td> <td>40</td> <td>60</td> <td>80</td> <td>100</td> </tr> <tr> <td>Heads</td> <td>11</td> <td>18</td> <td>24</td> <td>30</td> <td><b>37</b></td> </tr> <tr> <td>Rel. Fq.</td> <td>0.55</td> <td>0.45</td> <td><b>0.4</b></td> <td>0.375</td> <td>0.37</td> </tr> </table>	Throws	20	40	60	80	100	Heads	11	18	24	30	<b>37</b>	Rel. Fq.	0.55	0.45	<b>0.4</b>	0.375	0.37	<p>B1 B1</p>	
Throws	20	40	60	80	100															
Heads	11	18	24	30	<b>37</b>															
Rel. Fq.	0.55	0.45	<b>0.4</b>	0.375	0.37															
<p>11.(b) (Mid-points are) 4.5, 14.5 and 24.5. (Estimated total =) <math>3 \times 4.5 + 5 \times 14.5 + 2 \times 24.5 (= 135)</math> <math>\div 10</math> (Estimated mean =) = 13.5  (Difference = <math>15.2 - 13.5 =</math>) 1.7</p>	<p>B1 M1 m1 A1  B1</p>	<p>F.T. 'their mid-points' if within group.  C.A.O.  F.T. for difference between 15.2 and 'their derived estimated mean (<math>\neq 15.2</math>)'. Allow -1.7.</p>																		
<p>12.(a) -5</p>	<p>B1</p>																			
<p>12.(b) At least 7 correct plots and no incorrect plot.  A smooth curve drawn through their plots.</p>	<p>P1  C1</p>	<p>F.T. 'their (1, -5)' Allow <math>\pm</math> '½ a small square'. F.T. 'their 8 plots'. OR a curve through the 7 given points and (1, -5) Allow intention to pass through their plots. (<math>\pm</math> 1 small square horizontal or vertical.)</p>																		
<p>12.(c)(i) Line <math>y + x = 4</math> drawn.</p>	<p>B2</p>	<p>B1 for a straight line going through (0,4) or (4,0) BUT NOT line <math>y = 4</math> nor line <math>x = 4</math></p>																		
<p>12(c)(ii) -2.4 AND 3.4</p>	<p>B1</p>	<p>F.T. intersection of 'their curve' with 'their <math>y + x = 4</math>' (even for line <math>y = 4</math>) only if exactly two points of intersection. Must be seen to intersect their curve at two points. Allow <math>\pm</math> '1 small square'.</p>																		
<p>13. Sight of 1.25 or 125(%)  <math>\frac{n}{1.25n} (\times 100)</math>  = 80(%)</p>	<p>B1  M1  A1</p>	<p>Accept sight of <math>n</math> and <math>1.25n</math> where <math>n</math> may be any numerical value e.g. '18 and 22.5'.  <math>\frac{1}{1.25}</math> (<math>n=1</math>) OR 0.8 implies B1M1.  An answer of 80(%) gains B1M1A1.</p>																		
<p>14. <math>MN = 13.5 \times \cos 27</math>  = 12(-0...) (cm) ISW</p>	<p>M2  A1</p>	<p>M1 for <math>\cos 27 = \frac{MN}{13.5}</math>  <i>A correct and complete method (e.g. using two trigonometric relationships.)</i> M2 <i>MN = 12(-0...)(cm) ISW</i> A1</p>																		
<p>15.  Method to eliminate variable e.g. equal coefficients with intention to <u>appropriately</u> add or subtract' First variable found <math>x = 4</math> or <math>y = -3</math>. Substitute to find the 2<sup>nd</sup> variable. Second variable found.</p>	<p>M1  A1 m1 A1</p>	<p><i>No marks for 'trial and improvement'.</i> <i>No marks for an unsupported answer.</i> Allow 1 error in one term, not one with equal coefficients.  C.A.O. F.T. their '1<sup>st</sup> variable'.</p>																		

<p>16.(a) <math>20 \times 15 - \pi \times 4^2</math>  <math>\times 10</math>  <math>2497(\dots)</math> OR <math>3000 - 160 \pi</math></p>	<p>M1 m1 A1</p>	<p>Accept an answer between 2497 and 2498 inclusive OR 2500.  SC1 for sight of <math>\pi \times 4^2 \times 10</math> OR <math>160 \pi</math> (accept 502 to 503 inclusive).</p>
<p>16.(b)  (Mass =) <math>2497(\dots) \times 2.4</math> OR <math>2497(\dots) \times 0.0024</math>  <math>= 5993.6(\dots)(g)</math> OR <math>5.9936(\dots)(kg)</math>   6(kg)</p>	<p>M1 A1  A1</p>	<p>F.T. 'their volume in (a)'  Accept value truncated or rounded to a whole number. Ignore units.   F.T. from 'their 5993.6.g' or 'their 5.9936.kg' ONLY if M1 awarded AND 'their 5993.6.g' &gt; 500g or 'their 5.9936.kg' &gt; 0.5kg   If no marks awarded, allow SC1 for (Mass =) 'their volume' <math>\times</math> density, where density may have incorrect place value e.g. '2497(\dots) <math>\times</math> 0.024'</p>
<p>17. 8</p>	<p>B1</p>	
<p>18. <math>\frac{24 \times AC}{2} = 84</math> or equivalent.  AC = 7 (cm)   <math>(BC^2 =) 7^2 + 24^2</math>  <math>BC^2 = 625</math> or <math>(BC =) \sqrt{625}</math>  <math>(BC =) 25(cm)</math>   (Perimeter = <math>24 + 7 + 25 =</math>) 56(cm)</p>	<p>M1  A1  M1 A1 A1  B1</p>	<p>F.T. 'their AC'.  Final answer of BC = 625 is M1A0A0.  F.T. <math>\sqrt{\text{their } 625}</math> provided M1 gained.   F.T. 24 + 'their AC' + 'their BC' provided at least one M1 mark gained AND 'their BC' &gt; 24.   <u>Alternative method to find BC</u>  A correct and <u>complete</u> method (e.g.using two trigonometric relationships.) M2  BC = 25(cm) A1</p>