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# **GCSE MARKING SCHEME**

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**AUTUMN 2018**

**GCSE  
MATHEMATICS – NUMERACY  
UNIT 1 - HIGHER TIER  
3310U50-1**



## **INTRODUCTION**

This marking scheme was used by WJEC for the 2018 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 (3310U50-1)**

**AUTUMN 2018 MARK SCHEME**

<b>GCSE Mathematics – Numeracy Unit 1: Higher Tier</b>	<b>Mark</b>	<b>Comment</b>
1(a) 245°	B1	
1(b)(i) 17:30	B1	
1(b)(ii) 22:10	B1	
2. a = 55° b = 76° c = 104° d = 104°	B1 B1 B1 B1	FT 180° - 'their b' FT 180° - 'their b' or FT 'their c'
3(a) 'No' selected or unambiguously implied with a reason, e.g. 'insufficient data', 'only asked 14 people', 'a biased group of friends', 'she only asked her friends' 'because she has not asked a random sample (of people in Wales).'	E1	Do not accept, e.g. 'No' with 'most people own less than 12 pairs of shoes', 'she only asked 12 people' 'she has not asked which age group', 'because she could have asked a particular sex or age'  Allow, e.g. 'only x people were asked' where x = 13 or x = 15 only
3(b) Shows more than 3 groups between 1 and 18, which are: <ul style="list-style-type: none"> <li>• non-overlapping</li> <li>• exhaustive groups</li> </ul>	B2	Allow if the final groups goes to beyond 18 pairs Do not count 'none' or '0' as a group Groups do not need to be of equal width  B1 for more than 3 groups between 1 and 18 meeting 1 of the 2 bullet point conditions  Do not accept, e.g. <ul style="list-style-type: none"> <li>• 'men, women, children' or</li> <li>• sizes listed</li> </ul> without groups for the number of pairs  Ignore inclusion of number of people shown in their groups

<p>4(a) (Jade saves each week) <math>72 \times 0.21</math> or <math>7.2(0) + 7.2(0) + 0.72</math> (= £ 15.12)</p> <p>(Total savings 15.12) <math>\times 20</math></p> <p>(£) 302.4(0)</p> <p>(Jade's father pays £350 – 302.40 =) (£) 47.6(0)</p> <p>Organisation and communication</p> <p>Writing</p>	<p>M1</p> <p>M1</p> <p>A1</p> <p>B1</p> <p>OC1</p> <p>W1</p>	<p>Do not accept '1512' without indication of pence, unless used correctly in working These 2 M marks can be awarded in either order, i.e. <math>72 \times 20 (=1440)</math>, followed by <math>\times 0.21</math></p> <p>CAO</p> <p>FT 'their £302.40' provided</p> <ul style="list-style-type: none"> <li>• a percentage calculation using 72 has been involved AND</li> <li>• provided their answer is &lt; (£) 350</li> </ul> <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>4(b)(i) <math>100 - \frac{3}{25} \times 100</math> or <math>\frac{(25-3)}{25} \times 100</math></p> <p>88(%)</p>	<p>M1</p> <p>A1</p>	<p>Or equivalent Allow M1 for 88/100</p> <p>If no marks, award SC1 for an answer of or sight of 12(%) provided it is not from incorrect working</p>
<p>4(b)(ii) <math>abc + \pi a^2 c</math></p>	<p>B1</p>	
<p>4(c) <math>35 \times 9 \div 45</math> or <math>35 \div 5</math> or equivalent</p> <p>7 (cm) or 70 mm</p>	<p>M1</p> <p>A1</p>	<p>Allow with incorrect place value from conversion of units CAO. Do not accept an answer of:</p> <ul style="list-style-type: none"> <li>• 70 without units (mm)</li> <li>• 7 or 70 with incorrect units</li> </ul>



<p>6(a) Uniform scale from at least 5 (seconds) to at least 65 (seconds), <b>AND</b> time label</p> <p>Correct format of a box-and-whisker</p> <p>Showing least time 5 seconds</p> <p>Showing UQ 55 seconds</p> <p>Correct plotting upper end whisker at 65 seconds, LQ at 23 seconds AND median at 45 seconds</p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p>	<p>Accept 'seconds' as the time label, do not accept if only attached to values on the scale</p> <p>Do not ignore additional lines drawn End stopper lines omitted can be ignored</p> <p>FT for unambiguous indications of the following:</p> <p>On the graph paper</p> <p>On the graph paper</p> <p>On the graph paper</p>																
<p>6(b) <math>0.75 \times 240</math> or equivalent 180 (text messages)</p>	<p>M1</p> <p>A1</p>	<p>Allow sight of '75% of 240'</p> <p>If no marks, award SC1 for an answer of 60 (text messages)</p>																
<p>7(a) <math>(96 \div 8 =) 12</math> or <math>96 \div 12 = 8</math> or <math>8 \times 12 = 96</math></p> <table border="1" data-bbox="229 990 727 1048"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td> </tr> <tr> <td>6</td><td>18</td><td>30</td><td>42</td><td>54</td><td>66</td><td>78</td><td>90</td> </tr> </table>	1	2	3	4	5	6	7	8	6	18	30	42	54	66	78	90	<p>B1</p> <p>B1</p>	<p>May be implied by consistent position pattern +12 indicated</p> <p>CAO</p> <p>Sight of 12 for voucher 2 with no further working or entries is B0, B0</p>
1	2	3	4	5	6	7	8											
6	18	30	42	54	66	78	90											
<p>7(b) <math>120 \div 80 \times 100</math> or equivalent (£) 150</p>	<p>M1</p> <p>A1</p>																	



<p>8(a) Use of 2 as a denominator and power in the AER formula</p> <p>(AER =) <math>(1 + 0.04/2)^2 - 1</math>  Method to calculate <math>1.02^2</math></p> <p style="text-align: center;">= 0.0404  = 4.04 %</p>	<p>B1</p> <p>M1 m1</p> <p>A1 A1</p>	<p>For a correct method seen, not for accuracy  <math>1.02 \times 1.02 = 1.04</math> is not sufficient to award this m1 mark</p> <p>FT from B1M1m1A0 provided their percentage is greater than 4%</p>
<p><i>Alternative method:</i>  Intention to increase a sum of money by 2%  Correct method to increase a sum of money by 2% twice</p> <p style="text-align: center;"><u>increase</u> (<math>\times 100\%</math>)  original</p> <p style="text-align: center;">= 0.0404  = 4.04 %</p>	<p>B1</p> <p>M1</p> <p>M1</p> <p>A1 A1</p>	<p>(e.g. (£)1020)</p> <p>(e.g. (£)1040.40)</p> <p>If a candidate uses <u>new amount</u> (<math>\times 100\%</math>)  original  do not award M1 unless they then show the intention to subtract 1 (or 100%)</p> <p>FT from B1M1m1A0 provided their percentage is greater than 4%</p>
<p>8(b) Explanation e.g.  'So that customers can compare accounts', or  'So that customers (or banks) can compare interest rates accurately', or  'Customers (or banks) can easily work out how much they will have after a year', or  'To calculate (or show) how much interest they offer per year'</p>	<p>E1</p>	<p>Allow e.g.  'It's a higher rate than the nominal annual rate (to make it more attractive)'</p>
<p>8(c) <math>3000 \times 1.0404</math> OR  <math>3000 \times 1.02 \times 1.02</math></p> <p style="text-align: center;">= (£) 3121.2(0)  (£) 78.8(0)</p>	<p>M2</p> <p>A1 B1</p>	<p>FT their AER from part (a) provided of equivalent difficulty  M1 for <math>3000 \times 1.02</math> or equivalent</p> <p>FT from M2  FT provided M2 awarded AND  'their (£) 3121.2(0)' is &lt; (£) 3200</p> <p>If no marks awarded, and an integer AER derived in (a), then  SC1 for <math>3000 \times</math> 'their 1.0404'  SC2 for the correct evaluated difference between 3200 and <math>3000 \times</math> 'their 1.0404'</p>

<p>9(a) Explanation e.g.          'Because cumulative frequency is not accurate. It's an estimate', or          'Because the data is grouped. The median could be anywhere between 60 and 80', or          'The marks between 60 and 80 may not be evenly distributed', or          'The 24 marks between 60 and 80 may not be split evenly either side of 70', or          'The 13<sup>th</sup> mark between 60 and 80 may not be 70'          'The 30.5<sup>th</sup> mark is greater than 70'</p>	E1	<p>Do not accept e.g.          'This is only an estimate', or          'Because the data is grouped'</p>
9(b) 12	B1	
<p>10. <math>30 \times (\text{no. studying a language}) \div 250</math></p> <p>(Number in sample studying French =) 9</p> <p>Sight of 6.6 and/or 14.4 (or equivalent mixed numbers) leading to an answer of 9, 7, 14</p>	<p>M1</p> <p>A1</p> <p>A2</p>	<p>Or <math>0.12 \times (\text{no. studying a language})</math>          Sight of this calculation for any one language          Allow <math>(\text{no. studying a language}) \div 8.3(3)</math></p> <p>CAO</p> <p>No incorrect work should be seen for A2          A1 for <u>one error only</u> in working leading to an answer of 9, a, <math>21 - a</math>, (a needs to be an integer) OR          A1 for sight of 6.6 or 14.4, OR          A1 for an answer of 9, 7, 14          An unsupported 9, 7, 14 is awarded M0A0A0</p>
<p>11(a) <u>Use of 192.5</u>  <u>Use of 5.5 and 14.5</u></p> $\frac{2 \times 192.5}{5.5 + 14.5} \quad \left( \begin{array}{l} = 385 \\ \quad 20 \end{array} \right)$ $= 19.25 \text{ (s)}$	<p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p>	<p>In their final calculation</p> <p>In their final calculation</p> <p>FT 'their 192.5' provided <math>190 \leq s &lt; 195</math>, and 'their 5.5' provided <math>5 &lt; u \leq 6</math>, and 'their 14.5' provided <math>14 &lt; v \leq 15</math></p> <p>CAO</p>
<p>11(b) Use of 14.5, 8.5 and 21.5          Use or sight of <math>t(u + v)</math></p> $14.5 \times \frac{(8.5 + 21.5)}{2}$ $= 217.5 \text{ (m)}$	<p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p>	<p>In their final calculation</p> <p>In their final calculation</p> <p><b>Use of <math>t = 14</math>, <math>u=8</math>, <math>v=21</math>, 'their upper bounds' of <math>t</math>, <math>u</math> and <math>v</math> OR 'their lower bounds' of <math>u</math>, <math>v</math> and <math>t</math> in this expression implies this B1 mark</b></p> <p>FT 'their 14.5' provided <math>14 &lt; t \leq 15</math> and 'their 8.5' provided <math>8 &lt; u \leq 9</math>, and 'their 21.5' provided <math>21 &lt; v \leq 22</math></p> <p>CAO</p>

<p>12(a) (Half base diagonal<sup>2</sup> =) <math>7^2 + 7^2</math>  OR Half base diagonal<sup>2</sup> = 98 OR  (Half base diagonal =) <math>\sqrt{98}</math>  OR Half base diagonal = <math>\frac{1}{2} \sqrt{14^2 + 14^2}</math></p> <p>(Slant edge =) <math>\sqrt{98 + 8^2}</math> OR <math>\sqrt{7^2 + 7^2 + 8^2}</math></p> <p>Slant edge = <math>\sqrt{162}</math></p> <p style="text-align: center;">= <math>9\sqrt{2}</math></p>	<p>M1</p> <p>M2</p> <p>A1</p> <p>B2</p>	<p>Allow M1 for an appropriate <math>7^2 + 8^2</math> OR 113 OR <math>\sqrt{113}</math></p> <p>M1 for <math>98 + 8^2</math> OR <math>7^2 + 7^2 + 8^2</math></p> <p>CAO</p> <p>For B2, FT 'their derived 162' provided their 'b' is a prime number</p> <p>For B1, FT 'their derived 162'</p> <p>B1 for writing 162 as a product of 2 or more factors where one of the factors OR the product of a pair of their factors is a square number  e.g. <math>2 \times 81</math>, <math>3 \times 3 \times 18</math>, OR  B1 for writing <math>\sqrt{162}</math> as a product of 2 or more factors where one of the factors OR the product of a pair of their factors is a whole number  e.g. <math>\sqrt{2} \times \sqrt{9} \times \sqrt{9}</math></p>
<p>12(b) (Area factor =) <math>\left(\frac{160}{8}\right)^2</math> or equivalent</p> <p style="text-align: center;">= 400</p> <p>(Area of glass =) <math>400 \times 74</math></p> <p style="text-align: center;">= 29600 (cm<sup>2</sup>)</p>	<p>M2</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>M1 for <math>\frac{160}{8}</math> or equivalent OR sight of 20  8</p> <p>OR M1 for <math>\left(\frac{160}{8}\right)^2</math> with place value errors  e.g. <math>2^2</math> or 0.04</p> <p>CAO. May be implied in further working</p> <p>FT 'their <math>\left(\frac{160}{8}\right)^2</math>', or 'their <math>\left(\frac{1.6}{8}\right)^2</math>',  Must be from an area scale factor</p> <p>CAO</p>
<p>13. (Sector area =) <math>\frac{300}{360} \times \pi \times 12^2</math> (=120<math>\pi</math>)</p> <p>(Area of curved surface =)  <math>\frac{300}{360} \times 2 \times \pi \times 12 \times 10</math> (=200<math>\pi</math>)</p> <p><math>\frac{300 \times \pi \times 12^2}{360} + \frac{300 \times 2 \times \pi \times 12 \times 10}{360} + 2 \times 12 \times 10</math></p> <p>= 320<math>\pi</math> + 240 (cm<sup>2</sup>) or 80(4<math>\pi</math> + 3) (cm<sup>2</sup>)  or  equivalent</p>	<p>B1</p> <p>B1</p> <p>M2</p> <p>A1</p>	<p>Or equivalent  Allow B1 for <math>\frac{300}{360} \times \pi \times 12^2 \times 2</math></p> <p>Or equivalent</p> <p>Or equivalent  M1 for summing at least 3 terms with the equivalent of 2 of these terms correct  May be seen in stages</p> <p>CAO  Mark final answer</p>