



---

# **GCSE MARKING SCHEME**

---

**SUMMER 2018**

**GCSE (NEW)  
MATHEMATICS - NUMERACY  
UNIT 2 - INTERMEDIATE TIER  
3310U40-1**

## **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 (NEW)**

**SUMMER 2018 MARK SCHEME**

<b>GCSE Mathematics – Numeracy Unit 2: Intermediate Tier Summer 2018</b>	<b>Mark</b>	<b>Comment</b>
1(a) 180	B1	
1(b) Angle measured $135^\circ \pm 2^\circ$ $\frac{2}{5} \times 135^\circ$  = $54^\circ$	B1 M1 A1	FT for angles other than $135^\circ \pm 2^\circ$ provided < $360^\circ$ Accept angles in the range $53^\circ$ to $55^\circ$
1(c) $720 - 0.45 \times 720$ or $0.55 \times 720$  396 (males)	M1 A1	For complete method  If no marks, award SC1 for sight of 324 (females)
2(a) (Fresh water charge £) $25.25 \times 1.08$ (= 27.27) (Waste water charge £) $22.31 \times 1.70$ (=37.927)  (Total bill £ $27.27 + £37.927 = £$ ) 65.19(7) or 65.2(0)  <b>Undercharged (by)</b> (£)6.4(0) or (£)6.39(7)  Organisation and communication             Writing	M1 M1 A1 B1 OC1 W1	CAO  Must state under charged and the amount, however accept –(£)6.4(0) or –(£)6.39(7) FT difference between 'their derived total' and £58.80 with appropriate conclusion, over or under charged  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  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.

<p>2(b)(i) <math>25.25 \times 220</math> 5555 (gallons)</p>	<p>M1 A1</p>	<p>Mark final answer If no marks SC1 for either (<math>47.56 \times 220 =</math>) 10463(.2 gallons), or (<math>22.31 \times 220 =</math>) 4908(.2 gallons)</p>
<p>2(b)(ii) Suitable reason, e.g. 'as the conversion was only approximate', 'the <b>gallons</b> could have been rounded up or down', 'because it is to the nearest gallon'</p>	<p>E1</p>	<p>Accept 'I rounded my answer' following (b)(i) having been rounded, otherwise do not accept, e.g. 'Miss Price's bill may have been rounded up or down'</p> <p>Do not accept, e.g. 'she could have used less or more', 'she did not use an exact number of gallons' (as this repeats the question), 'she rounded up the amount of fresh water used', 'it is based on an estimate of how much fresh water is used and how much waste water is produced', 'it is likely she used just over or under a certain number of gallons', 'because it is an estimate'</p>
<p>3. (Cost of 1 apple <math>78 \div 3 =</math>) 26(p)  (Cost of 1 pear <math>=</math>) <math>(1(. )22 - 26) \div 3</math>  <math>(=)</math> 32(p)  (Cost of 5 pears + 2 apples <math>=</math>) <math>5 \times (0.)32 + 2 \times (0.)26</math> or <math>1(. )60 + (0.)52</math>  <math>(=)</math> (£)2.12 or 212(p)  (Change £5 – 2.12 <math>=</math>) (£)2.88</p>	<p>B1  M1  A1  M1  A1  B1</p>	<p>Accept 0.26p only if used correctly in further working</p> <p>Allow intention to divide by 3 FT 'their 26' provided evidence of <math>78 \div 3</math> Algebraic notation is not required Allow inconsistent place value for M1 only, unless corrected later, i.e. 3 pears + 26 = 1.22 or 3 pears = 1.22 – 26</p> <p>FT 5× 'their (0.)32' + 2 × 'their (0.)26' Allow inconsistent place value for M1 only, unless corrected later</p> <p>If units are given they must be correct</p> <p>FT provided at least 3 previous marks are awarded Do not penalise incorrect units if already penalised, otherwise penalise incorrect units -1</p>

4(a) 48 cm	B1	
4(b) 1:15 p.m. and 1:30 p.m	B1	
4(c) Suitable explanation, e.g. 'water level drops', 'depth of the water falls', 'depth is decreasing (during low tide)', 'depth of water is decreasing', 'water level decreased at night', 'tide goes down'	E1	Ignore any additional comments or values  Must refer to 'water' or 'depth'  Allow, e.g. 'when the water starts to run shallower'  Do not accept, e.g. 'negative gradient', 'goes down', 'decrease going into the evening', 'depth of river is lower at this time', 'when the water starts to run shallow', 'river is dropping', 'it drops', 'it is decreasing', 'it goes down'
4(d) 1 hour	B1	

<p>5(a) 24.25 suitcase symbols  <math>9700 \div 24.25</math></p> <p>(Represents) 400 (people)</p>	<p>B1 M1</p> <p>A1</p>	<p>FT 'their 24.25' provided <math>\geq 23</math>  Allow M1 for sight of any one of</p> <ul style="list-style-type: none"> <li>• <math>422 \times 23 = 9706</math></li> <li>• <math>404 \times 24 = 9696</math></li> <li>• <math>388 \times 25 = 9700</math></li> </ul> <p><math>24.25 \div 9700</math> is M0, unless 400 seen</p> <p>FT provided 'their 400' is rounded to a whole number of people  Do not allow an embedded answer with a multiplication</p> <p><i>Unsupported 400 (people) is awarded all 3 marks</i></p> <p>(Note:  <math>9700 \div 23</math> gives 421 or 422 people  <math>9700 \div 23.25</math> gives 417 or 418 people  <math>9700 \div 23.75</math> gives 408 or 409 people  <math>9700 \div 24</math> gives 404 or 405 people  <math>9700 \div 25</math> gives 388 people  <math>9700 \div 26</math> gives 373 or 374 people  <math>9700 \div 27</math> gives 359 or 360 people  <math>9700 \div 28</math> gives 346 or 347 people  <math>9700 \div 29</math> gives 334 or 335 people  <math>9700 \div 30</math> gives 323 or 324 people)</p>
<p>5(b) 3 : 2</p>	<p>B1</p>	
<p>5(c) Italy</p>	<p>B1</p>	
<p>5(d) <math>590 \times 0.6(0) \div 1.18</math> or equivalent</p> <p>(£) 300</p>	<p>M3</p> <p>A1</p>	<p>Ignore any additional incorrect calculations for M2 or M1</p> <p>M2 for <math>590 \times 0.6(0)</math> (= 354) or equivalent, or  M1 for <math>590 \div 1.18</math> (= 500)</p> <p>OR</p> <p>M1 for 590 – 'their 40% of 590' AND  M1 for 'their 60%' <math>\div 1.18</math></p> <p>CAO.  Accept an embedded answer,  <math>300 \times 1.18 = 354</math></p> <p>An answer of (£)200, from  <math>590 \times 0.4(0) \div 1.18</math> is awarded M1  (for <math>590 \div 1.18</math>) and then SC1</p>

<p>6. Costs are (Helmet with discount £) <math>80 - 0.15 \times 80</math> or <math>0.85 \times 80</math> or equivalent</p>	M1	<p>(= £68) May be considered in stages</p>
<p>(Fuel, 1 month =£) <math>1.26 \times 350 \div 20</math> or <math>0.06(3) \times 350</math></p>	M1	<p>(=£22.05 or £21)</p>
<p>(Total of all costs <math>400 + 151.2(0) + 37 + 68 + 22.05</math> or <math>588.20 + 68 + 22.05</math>)</p>	M1	<p>FT 'their £68' and 'their £22.05' (including use of £21)</p>
<p style="text-align: right;">(£)678.25</p>	A1	<p>CAO. OR from alternative method looking at months to save for each item sight of either 11 months and a further (£)18.25 to pay or 12 months and (£)41.75 left over  (this method implies possible final m1 and/or A1)</p>
<p>(Need to save for) <math>678.25 \div 60</math> (months)</p>	m1	<p>Award of m1 may be implied by A1 rounded up number of complete months FT 'their £678.25' provided at least M1 previously awarded (£677.20 ÷ 60 leads to 11.2866....) Allow sight of repeated addition of £60, at least showing 11 lots of £60 (= £660) An answer of 11(.3... months) implies m1</p>
<p style="text-align: center;">12 (complete months)</p>	A1	<p>FT for 'their total cost' ÷ 60 with the answer rounded up to whole number of months provided at least M1 previously awarded</p>

<p>7(a) (Period of time is) 3 years 4 months or 40 months</p> <p>Use of an amount between £16.8 and £22 million inclusive (£19.35 million being the mean of the values given in the question)</p> <p>(Amount given to charity per month is) An amount between (£)16.8 and (£)22 million inclusive divided by (number of months) 40</p> <p>From correct calculation, an answer in the range (£)0.4 to (£)0.55 <b>million</b> inclusive or (£)400 000 to (£)550 000 inclusive</p>	<p>B1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p><u>No marks if no working shown</u> Accept 3 years 3 months 30 days or 3 years 3 months 29 days</p> <p>Ignore incorrect interpretation of 'million', including omission of 'million' Accept sight of an amount in this range used in any calculation</p> <p>FT from M1 FT 'their 40' provided it is within the inclusive range of 36 to 52 months Ignore incorrect interpretation of 'million', including omission of 'million'</p> <p>Do not accept omission of the word 'million' FT depends on M1, M1 previously awarded If working shown, this must be from correct calculation Ignore any additional rounding Accept a range given as an answer provided it falls within the answer range given Accept an answer rounded as an estimate, from working, provided it falls within the range given</p> <p><i>(FT within the inclusive range of 36 to 52 months gives an answer in the inclusive range £0.32 to £0.62 million)</i></p>
<p>7(b) Impact, e.g. 'more in September 2012 than in September 2014 as the number of 5p bags bought is falling over time', 'less given to good causes', 'decreases', 'less (given)'</p>	<p>E1</p>	



<p>8(a) (Rhodri's time is) <math>5.5/22</math>  <math>= 0.25</math> (hours) or 15 mins</p> <p>Megan's time is <math>0.25</math> (hrs) – 5 mins  (10 minutes or <math>\frac{1}{6}</math> hour or <math>0.166\dots</math>hour)</p> <p>(Megan's route is)  <math>12 \times 10 \quad (\div 60)</math>    <math>= 2</math> (miles)</p>	<p>M1 A1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p>Use of 0.25 hours as 25 minutes is A0 otherwise if not used, ignore incorrect conversion to minutes</p> <p>For the idea, irrespective of inconsistent units  FT 'their 0.25 hours' or 'their 15 minutes', including use of 0.25 hours, e.g. as 25 minutes</p> <p>FT 'their time used', written in hours or minutes provided at least M1 previously awarded</p> <p>CAO  No marks for an unsupported answer of 2 (miles)</p>
8(b) 66 (km/h)	B1	
<p>9(a)(i) <math>(x^2 =) 3^2 + 12^2</math>  <math>x^2 = 153</math> or <math>(x =) \sqrt{153}</math></p> <p>12.4 (cm)</p>	<p>M1 A1 A2</p>	<p>Or alternative full method  Or accurate first stage of alternative full method  Must be 3 s.f.  A1 for sight of <math>(x =) 12.40</math> or <math>12.3(69\dots\text{cm})</math>, NOT for 12 (cm)  FT from M1 for the correctly evaluated square root of 'their 153' provided 'their answer' &gt; 12 (cm)</p>
<p>9(a)(ii) <math>(y =) \tan^{-1} 3/12</math> or <math>\tan^{-1} 0.25</math>, or  <math>\cos^{-1} 12/12.4</math> or <math>\cos^{-1} 0.967\dots</math> or  <math>\cos^{-1} 0.97\dots</math>, or <math>\sin^{-1} 3/12.4</math> or <math>\sin^{-1} 0.24\dots</math>,</p> <p><math>(y =) 14.(0\dots^\circ)</math> (which is &lt; <math>15^\circ</math>)</p>	<p>M2 A1</p>	<p>FT 'their 12.4' provided &gt; 12 (cm)  M1 for <math>\tan y = 3/12</math> or <math>\cos y = 12/12.4</math> or <math>\sin y = 3/12.4</math></p> <p>Accept <math>14.(59\dots^\circ)</math> from use of 12.4 cm</p>
<p>9(b) <math>12 \times 4.5 \div 3</math> or <math>4.5/\tan 14.(0\dots^\circ)</math>  18(cm) or 18.0(... cm)</p>	<p>M1 A1</p>	<p>FT 'their angle y'  ISW to calculate the hypotenuse</p>
<p>10(a) <math>(2 \times) 65 \times 5</math>  650 (m<sup>2</sup>)</p>	<p>M1 A1</p>	
<p>10(b) (Area of both ends) <math>\pi \times 20^2 - \pi \times 15^2</math>  or equivalent (=<math>549.7\dots</math>)</p> <p>+ 650</p> <p>An answer in the range  1199 (m<sup>2</sup>) to 1200 (m<sup>2</sup>)</p>	<p>M2 m1 A1</p>	<p>(= <math>1256.(...) - 706.(...)</math>)  M1 for <math>\frac{1}{2} \times \pi \times 20^2 - \frac{1}{2} \times \pi \times 15^2</math> or  <math>2 \times \pi \times 20^2 - 2 \times \pi \times 15^2</math></p> <p>FT adding 'their (a)'  FT provided at least M1 previously awarded</p> <p>Accept <math>175\pi + 650</math> (m<sup>2</sup>)  FT from M2, m1 previously awarded</p>
<p>10(c) Area <math>\times (0.)20 \div 3</math>    £80</p>	<p>M1 A1</p>	<p>FT 'their area' from 10(b)</p> <p>Must be correct to the nearest £  An answer of 8000 implies M1, A0</p>

<p>11. <math>C = \frac{300 \times (60 - 32)}{32 - 8}</math></p> <p style="text-align: right;">= 350 (litres)</p> <p><math>T = \frac{350 + 300}{26}</math></p> <p style="text-align: right;">= 25 (minutes)</p>	<p>M2</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>M1 for any 3 or 4 values substituted correctly</p> <p>CAO</p> <p>FT 'their derived 350' and 'their 300' (used as H)</p> <p>If no marks, award SC1 for all 5 of the following correctly matched, i.e. H = 300, M = 32, X = 60, Y = 8, F = 26</p>
<p>12(a) Midpoints 20.5, 21.5, 22.5, 23.5 Missing 10 days for <math>23 \leq t &lt; 24</math></p> <p style="text-align: center;"><math>20.5 \times 4 + 21.5 \times 8 + 22.5 \times 8 + 23.5 \times 10</math> (= 82 + 172 + 180 + 235 = 669)</p> <p style="text-align: center;"><math>\div 30</math></p> <p style="text-align: right;">22.3(°C)</p>	<p>B1</p> <p>B1</p> <p>M1</p> <p>m1</p> <p>A1</p>	<p>FT 'their 10' provided <math>\neq 0</math> Allow with incorrect midpoints provided each one is within the correct interval including 'bounds'</p> <p>FT 20 + 'their 10'</p> <p>Allow 22(°C) from correct working</p> <p>If no marks or first B1 only, award SC1 for an answer of 21.7 (°C) (from working with the 20 days given)</p>
<p>12(b) Suitable assumption stated, e.g. 'used the midpoints (to represent each group)', 'I used a value in each of the groups to represent the group', 'the temperature is between the 2 values each time'</p>	<p>E1</p>	<p>FT from 'their points' used in (a)</p>
<p>12(c) Suitable reason given, e.g. 'many of the temperatures were less than the midpoint of the group in which they were recorded', 'the temperatures were often towards the lower end of the groups'</p>	<p>E1</p>	<p>Do not accept e.g. 'mid points were used', 'Faryl used exact values', 'raw data was used by Faryl', 'Faryl found the actual mean' without further explanation</p>