



GCSE MARKING SCHEME

SUMMER 2018

**GCSE (NEW)
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 (NEW)
SUMMER 2018 MARK SCHEME**

GCSE Mathematics – Numeracy Unit 1: Higher Tier Summer 2018	Mark	Comment
<p>1(a) (Total area =) $15 \times 15 + 4 \times 5$ or $20 \times 4 + 11 \times 15$ or $20 \times 15 - 11 \times 5$ or equivalent (Volume = total area) $\times 0.2$</p> <p style="text-align: right;">(Volume =) $49 \text{ (m}^3\text{)}$</p>	<p>M1</p> <p>M1</p> <p>A2</p>	<p><i>Note: check diagram for the area</i> Accept any correct area calculation</p> <p>Allow for 'their total area' $\times 0.2$ where 'their area' includes a product, or for one rectangular (or square) area $\times 0.2$</p> <p>FT from 1 measurement error in a sum or difference of two products, i.e. only one measurement incorrect within one product (M0 M1 A2 is possible to award)</p> <p>A1 for calculations with evaluated terms as shown (in bold and underlined)</p> <p>FT from M1, M0 (area $225 + 20$ or $80 + 165$ or $300 - 55$) <u>245</u>(m^2),</p> <p>OR</p> <p>FT from M1, M1: for one area product correctly evaluated within 'their area' AND $\times 0.2$ correctly evaluated</p> <p><u>45</u> + $4 \times 5 \times 0.2 \text{ (m}^3\text{)}$, or $15 \times 15 \times 0.2 +$<u>4</u>($\text{m}^3$), or <u>16</u> + $11 \times 15 \times 0.2 \text{ (m}^3\text{)}$, or $20 \times 4 \times 0.2 +$<u>33</u>(m^3), or <u>60</u> – $11 \times 5 \times 0.2 \text{ (m}^3\text{)}$, or $20 \times 15 \times 0.2 -$<u>11</u> ($\text{m}^3$)</p> <p>Accept implied correctly evaluated area product, e.g. $4 \times 5 + 15 \times 15 = 20 + 125 = 145$ With $145 \times 0.2 = 29 \text{ (m}^3\text{)}$, award M1, M1, A1 (although 125 is incorrect)</p>
<p>Organisation and communication</p>	<p>OC1</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>Writing</p>	<p>W1</p>	<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.

$1(b) \frac{2}{3} \times 6 \times 45 \quad \text{OR} \quad \frac{2}{3} \times 45 \times 6$ <p style="text-align: center;">or equivalent</p> $+ 35$ <p style="text-align: right;">(£) 215</p>	M1 m1 m1 A1	Allow sight of $\frac{2}{3}$ of 6 or $\frac{2}{3}$ of 45 (= 4×45 or 30×6 or $\frac{2}{3} \times 270$) (= 180) Intention to add 35 Depends on M1 only CAO
$2. \quad 49 \times 20$ <p style="text-align: right;">(= £) 980</p> $\% \text{ Interest} \quad \frac{980 - 400}{400} (\times 100)$ <p>or $\frac{980}{400} (\times 100) - 1 (\times 100)$</p> <p style="text-align: right;">145 (%)</p>	M1 A1 m1 A1	FT 'their 980' provided M1 previously awarded Award m1 for complete method to show what percentage 580 is of 400
3(a) 190°	B1	
3(b) 332°	B1	
3(c)(i) $8400 \div 200$ 42 (population/km ²)	M1 A1	Or equivalent CAO
3(c)(ii) $5 \times 8400 \div (3 + 4 + 5)$ 3500 (people)	M1 A1	Full method required Accept embedded answer, provided clearly Gwyndir
$4(a) \quad 0.02 \times 3000 + 3000 \quad (= \text{£}3060)$ $0.02 \times 3060 + 3060$ <p style="text-align: right;">(£)3121.2(0)</p>	M1 M1 A1	Allow for sight of 3060 (irrespective of labelling) or for sight of 3120 (simple interest) FT 'their 3060', mark is for the method (= £61.2(0) + £3060) CAO <i>Alternative:</i> Sight of $1.02^2 \times 3000$ M1 1.0404×3000 M1 FT 'their 1.0404' incorrectly evaluated (£)3121.2(0) A1 CAO If no marks, award SC1 for (£)2881.2(0) (from depreciation)
$4(b) \quad 72 \div 0.8 \text{ or } 100 \times 72 \div 80$ <p style="text-align: right;">(£) 90</p>	M1 A1	Accept an unsupported answer of (£)90 Allow M1, A1 for a (£)90 found from trial & improvement

<p>5. (Maximum cup height)12.5 (cm) AND (Maximum gap) 4.5 (cm) OR For use of 12.43 to 12.499... AND 4.43 to 4.499...</p> <p>(Maximum height of 7 coffee mugs is) $12.5 + 6 \times 4.5$</p> <p style="text-align: center;">(=) 39.5 (cm)</p> <p>Conclusion or reason, e.g. '(as 39.5 cm > 39 cm) Michelle cannot be certain the mugs will fit'</p>	<p>B1</p> <p>M2</p> <p>A1</p> <p>E1</p>	<p>For sight of 12.5 and 4.5 (ignoring any least measures given)</p> <p>FT 'their 12.5' and 'their 4.5' provided in ranges >12 to 12.5 and >4 to 4.5 respectively</p> <p>Award M1 only (A0) for $12.5 + 7 \times 4.5$ (A0)</p> <p>Depends on at least 2 marks previously awarded FT 'their 39.5' irrespective if <39 or >39</p> <p>An unsupported 39.5 is no marks as no working shown</p>
<p>6(a) 20 to 25 minutes</p>	<p>B1</p>	
<p>6(b) 'No' indicated or unambiguously implied, with a reason, e.g. 'only shows data for groups', 'it was in the group 40 to 45 minutes', 'doesn't show how many runners finished in 45 minutes', 'the last 2 runners took between 40 and 45 minutes'</p>	<p>E1</p>	<p>Do not accept any reason implying 'Yes'</p> <p>Allow 'No' with, e.g. 'the graph shows the cumulative frequency not the actual times', 'doesn't show the actual times'</p> <p>Do not accept, e.g. 'it goes to the nearest 5 minutes', 'it shows frequency not times of results', 'it doesn't show how many runners finished between 40 and 45 minutes'. 'because it can be an average'</p>
<p>6(c) 70% (within 30 minutes) (80% within) 35 (minutes)'</p>	<p>B1</p> <p>B1</p>	
<p>6(d) Difference 26 - 24.5 to 24.8 Answer in the range</p> <ul style="list-style-type: none"> • 1.2 to 1.5 (minutes), or • 1 minute 12 seconds to 1 minute 30 seconds 	<p>M1</p> <p>A1</p>	<p>Do not accept an answer in the correct range from incorrect working Mark final answer If units are given they must be correct</p>

<p>7(a) 25% of 3000 or 0.25×3000 or equivalent</p> <p>750 (people)</p>	<p>M1</p> <p>A1</p>	<p>If no marks, award SC1 for an answer of 2250 (people)</p>
<p>7(b) Idea to consider fraction or decimal part between the median & UQ $\frac{2}{3} \times 0.25 \times 3000$ or equivalent 500 (people)</p>	<p>M1</p> <p>m1</p> <p>A1</p>	<p>For example, sight of 10/15 (= $\frac{2}{3}$) or 5/15 (= $\frac{1}{3}$) FT 'their 750' from (a)'</p>
<p>7(c)</p> <p>Indicates or unambiguously implies 'North Entrance' with a suitable reason, e.g. 'upper quartile is less than for the South Entrance', '3/4 took less than 44 minutes to queue at the North entrance', North as $\frac{3}{4}$ took less than 60 minutes at the South Entrance',</p> <p>OR</p> <p>Indicates or unambiguously implies 'South Entrance' with a suitable reason, e.g. '25% people in 20 minutes at South entrance compared with 24 minutes at the North entrance'</p>	<p>E1</p>	<p>Do not ignore additional incorrect statements</p> <p>Implies that the majority of people got through quicker at the North Entrance</p> <p>Allow, e.g. 'North Entrance, most people 44 minutes whilst South it was 60 minutes'</p> <p>Do not accept indication of 'South Entrance' with a reason based on the team being slower, e.g. 'time was taken to search of handbags'</p>
<p>8(a) e.g. $100x = 41.666\dots$ and $1000x = 416.666\dots$ and attempt to subtract</p> $(x =) = \frac{375}{900} \text{ or } \frac{4125}{9900} \text{ or } \frac{41625}{99900}$ $= \frac{5}{12}$	<p>M1</p> <p>A1</p> <p>A1</p>	<p>Or equivalent Correct values need to be used in the attempted subtraction</p> <p>Allow A1 for e.g. 3.75/9</p> <p>Must be in lowest terms FT 'their 375/900' provided of equivalent difficulty Accept unsupported $\frac{5}{12}$ only</p>
<p>8(b) (Number of months' pay received =) 5</p>	<p>B1</p>	<p>FT 'their derived $\frac{5}{12} \times 12$ truncated or rounded, provided their answer < 12</p>
<p>9.</p> <p>(Fuel used at 50 mph =) $(50 \times 3) \div 60$ = 2.5 (gallons) or equivalent</p> <p>(Fuel used at 70 mph = $4.6 - 2.5$) = 2.1 (gallons)</p> <p>(Dist travelled at 70 mph = 2.1×50) = 105 (miles)</p> <p>(Time travelling at 70 mph =) $105 \div 70$</p> <p>= 1.5 hours or equivalent</p>	<p>M1</p> <p>A1</p> <p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p>	<p>FT 'their derived 2.5' provided < 4.6</p> <p>FT 'their 2.1'</p> <p>FT 'their 105' provided an attempt has been made to use 'their 2.1' to find the distance travelled at 70 mph</p> <p>CAO</p>

<p>10(a) $\frac{6 \times 10^9}{1.5 \times 10^8}$ or equivalent</p> <p>40 or 4×10^1</p>	<p>M1</p> <p>A1</p>	<p>A calculation, using approximations, that would lead to an answer of < 50</p> <p>FT their calculation e.g. $\frac{5.9 \times 10^9}{1.5 \times 10^8}$ leads to an answer of 39.33</p>
<p>10(b)</p> <p>$63000 \times 1.5 \times 10^8$ OR $60000 \times 1.496 \times 10^8$ OR $60000 \times 1.5 \times 10^8$</p> <p>= $9.4(5) \times 10^{12}$ (km) OR $8.9(76) \times 10^{12}$ (km) OR 9×10^{12} (km)</p>	<p>M2</p> <p>A1</p>	<p>Acceptable options for M2 and A1 Award M1 only for $63000 \times 1.496 \times 10^8$ Or M1 for 1 slip in the power of 10, but otherwise correct</p> <p>FT from M2 only If no marks awarded, SC1 for $6(3) \times 10^{12}$ (km)</p>
<p>11(a) 0.625 mg</p>	<p>B1</p>	
<p>11(b) $m = 160 \times 0.25^t$ or $m = \frac{160}{4^t}$ or $m = 160 \times (\frac{1}{4})^t$ or equivalent</p>	<p>B3</p>	<p>B2 for 160×0.25^t or $\frac{160}{4^t}$ or $160 \times (\frac{1}{4})^t$ or or $m = (160 \times 0.25)^t$ or $m = 160 \times \frac{1}{4}$</p> <p>B1 for sight of 0.25^t or 4^t or $(\frac{1}{4})^t$ or $160 \times \frac{1}{4}$ or $(160 \times 0.25)^t$</p> <p>B0 for $\frac{1}{4}$ only</p> <p>If no marks awarded: SC2 for $m = 160 \times 0.75^t$ or $m = 160 \times (\frac{3}{4})^t$ SC1 for 160×0.75^t or $160 \times (\frac{3}{4})^t$ or $m = 160 \times \frac{3}{4}$</p>
<p>12. (Scale factor =) $\sqrt{\frac{3600}{400}}$ OR $\sqrt{\frac{400}{3600}}$ = 3 OR 1/3 or equivalent (Height =) 16 (cm)</p>	<p>M1</p> <p>A1</p> <p>B1</p>	<p>Or equivalent</p> <p>FT provided M1 previously awarded <i>Alternative method e.g.</i> <i>M1 for (Lengths in ratio) $\sqrt{400} : \sqrt{3600}$</i> <i>A1 for 1 : 3 or equivalent</i> <i>B1 for (Height =) 16 (cm)</i></p>
<p>13(a) Appropriate bar of height 4.8</p>	<p>B2</p>	<p>B1 for sight of $24 \div 5$ or 4.8</p>
<p>13(b)</p> <p>$10 \times 0.6 + 10 \times 2 + 5 \times 6 + 5 \times 8 (+ 24) + 20 \times 1$ = 140</p> <p>Search for height in the group 145 to 150</p> <p>$6x = 9$ OR $6x = 21$ $x = 1.5$ OR $x = 3.5$ (Lower quartile =) 146.5 (cm)</p>	<p>M1</p> <p>A1</p> <p>S1</p> <p>M1</p> <p>A1</p> <p>A1</p>	<p>Allow M1 for at least 4 correct products CAO <i>Alternative method:</i> <i>M1 for $10 \times 0.6 + 10 \times 2 + 5 \times 6 + 1.75 \times 8$</i> <i>Allow M1 for 3 correct products which must include 1.75×8</i> <i>A1 for 70 CAO</i></p> <p>FT 'their 140' $\div 4$, and M1 previously awarded OR $\frac{9}{30} \times 5$ OR $\frac{21}{30} \times 5$</p> <p>Or equivalent</p>

14(a) 3π	B1	
14(b) Sight of $\frac{120 \times 2 \times \pi \times 4.5}{360}$ OR $\frac{150 \times 2 \times \pi \times 3}{360}$ $\frac{120 \times 2 \times \pi \times 4.5}{360} + \frac{150 \times 2 \times \pi \times 3}{360}$ $= \frac{3\pi}{3} + \frac{5}{2}\pi$ OR $\frac{3\pi}{3} + 2.5\pi$ OR $\frac{11\pi}{2}$ or 5.5π (Length of belt =) $75 + \frac{17\pi}{2}$ or $75 + 8.5\pi$ or $\frac{150 + 17\pi}{2}$	B1 M1 A1 B1	Or equivalents Or equivalent May be implied in further working or final answer FT their answer to (a) and 'their $11\pi/2$ ' provided M1 awarded Needs to be in its simplest form If no marks awarded, SC2 if $3\pi/2$ given in (a), leading to an answer of $75 + 17\pi/4$ or $75 + 4.25\pi$ SC1 if $3\pi/2$ given in (a), leading to an unsimplified version of $75 + 17\pi/4$
14(c) Use of $\frac{3}{4.5}$ or $\frac{4.5}{3}$ or equivalents with 2400 $2400 \times \frac{3}{4.5}$ or equivalent = 1600 (revolutions)	B1 M1 A1	e.g. ratio of 3 : 4.5 or 4.5 : 3 or equivalents B0 if 1.5 ($4.5/3$) comes from $3 + 1.5 = 4.5$ <i>Alternative method:</i> B1 for use of $6/4.5$ or $4.5/6$ with 1200 M1 for $1200 \times \frac{6}{4.5}$ or equivalent A1 for 1600 (revolutions)