



GCSE MARKING SCHEME

AUTUMN 2018

**GCSE
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 (3310U40-1)

AUTUMN 2018 MARK SCHEME

GCSE Mathematics – Numeracy Unit 2: Intermediate Tier	Mark	Comment
1(a)(i) 46×0.78 or $46 - 46 \times 0.22$ (£)35.88	M1 A1	Or equivalent (46 - 10.12)
1(a)(ii) $\frac{5 \times 43.6(0)}{8}$ or $43.6(0) - \frac{3 \times 43.6(0)}{8}$ (£)27.25	M1 A1	Or equivalent (43.6(0) – 16.35) Accept use of 0.375 or 0.625 Allow use of 0.38 or 0.62 for M1 only <i>If no marks in (i) and (ii), award SC1 in (ii) for answers of (£)10.12 and (£)16.35 respectively</i>
1(b) $\frac{6}{43}$	B1	

<p>2. Red paint 500ml 1 tin</p> <p>$(250 \div 5) \times 200$ or 50×200 or 40×250 or 20×500 or equivalent calculation that could lead to 10 000</p> <p>OR</p> <p>sight of 40 : 2 : 1 or equivalent (not 200 : 10 : 5 alone)</p> <p>10 000 ml white paint</p> <p>White paint 1 litre 10 tins</p> <p>12 tins of paint altogether</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>A2</p> <p>B1</p>	<p>Allow Red paint 250ml with 2 tins</p> <p>FT 20 × 'their quantity of red paint' from the table</p> <p>OR 10 litres</p> <p>CAO A1 for any one of</p> <ul style="list-style-type: none"> • 20 tins 500 ml white • 40 tins 250 ml white • 10 (tins) recorded in the table for white without '1 litre' or with 10 000ml, 10 litres • 20 × 'their quantity of red paint' correctly evaluated with correct decisions regarding possible number and size of tins (need not be least number of tins) • provided M1 awarded for 'their 10000 ml' used correctly to find minimum number of appropriate size tin, including if necessary any rounding up <p>CAO must from sum of 1 + 1 + 10 with evidence of 10 000 ml white paint</p> <p>Award SC marks as detailed: Total amount of paint, use of 250 ml tins:</p> <table border="1" data-bbox="863 1238 1230 1397"> <tr> <td>Red 500 ml</td> <td>2</td> </tr> <tr> <td>White 10 litres or 10000 ml</td> <td>40</td> </tr> <tr> <td>Total number of tins</td> <td>43</td> </tr> </table> <p>Overall marks are B0, M1, A1 and SC2</p> <p>Total amount of paint, use of 500 ml tins:</p> <table border="1" data-bbox="863 1487 1230 1646"> <tr> <td>Red 500 ml</td> <td>1</td> </tr> <tr> <td>White 10 litres or 10000 ml</td> <td>20</td> </tr> <tr> <td>Total number of tins</td> <td>22</td> </tr> </table> <p>Overall marks are B1, M1, A1 and SC1</p>	Red 500 ml	2	White 10 litres or 10000 ml	40	Total number of tins	43	Red 500 ml	1	White 10 litres or 10000 ml	20	Total number of tins	22
Red 500 ml	2													
White 10 litres or 10000 ml	40													
Total number of tins	43													
Red 500 ml	1													
White 10 litres or 10000 ml	20													
Total number of tins	22													

<p>3. (Tablets £) $(55 + 48) \times 220$ (= £ 22660)</p> <p>(Covers £) $(48 + 14) \times 18$ (= £1116)</p> <p>(£) 23 776</p>	<p>M1</p> <p>M1</p> <p>A1</p>	<p>Allow with missing brackets</p> <p>Allow with missing brackets</p> <p>CAO</p>
<p>3. <i>Alternative method:</i></p> <p>$55 \times 220 + 48 \times (220 + 18) + 14 \times 18$ (= 12 100 + 11 424 + 252)</p> <p>OR</p> <p>$55 \times 220 + 48 \times 220 + 48 \times 18 + 14 \times 18$ (= 12 100 + 10 560 + 864 + 252)</p> <p>(£) 23 776</p>	<p>M2</p> <p>A1</p>	<p>Allow with missing brackets</p> <p>M1 for: <i>Sight of any 1 of the following:</i></p> <ul style="list-style-type: none"> • $55 \times 220 + 14 \times 18$ • $48 \times (220 + 18)$ • 12 100, 10 560, 864 and 252 • 12 100, 11 424 and 252 <p>CAO</p>
<p>4(a) Profit: sight of 5% or 18/360 or 1/20 or 0.05</p> <p>Any of the following methods, or equivalent</p> <ul style="list-style-type: none"> • 0.05×9100 (million) • $0.05 \times 9\ 100\ 000\ 000$ • 9100 (million) – 0.95×9100 • $9100\ 000\ 000 - 0.95 \times 9100\ 000\ 000$ <p>(£) 455 (million)</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>Allow for sight of 16/360 to 20/360</p> <p>Award of M1 implies previous B1 FT 'their 100-50-25-10-5-5' or use of 16/360 to 20/360 Allow embedded '5%' within a repeated subtraction from 9100 million Allow place value error from misinterpretation of million, i.e. $0.05 \times 9100(0\dots)$ Do not allow for 5% of 9100 (million) or equivalent seen without convincing working or an answer implying 'x' has been used</p> <p>CAO mark final answer, this being the answer line if completed Allow for (£) 455 000 000 (including in the answer space)</p>
<p>4(b) 370 000</p>	<p>B1</p>	

<p>4(c) Any one of:</p> <ul style="list-style-type: none"> • $\frac{(900 - 828)}{900} (\times 100 = 8\%)$ • $0.08 \times 900 (=72)$ • $0.92 \times 900 (= 828)$ • $100 \times 828 \div (100 - 8) (= 900)$ • $828 \div 900 (\times 100) (= 0.92 (92\%))$ <p>Indicates or implies 'Yes' AND as appropriate:</p> <ul style="list-style-type: none"> • $\frac{(900 - 828)}{900} \times 100 (=) 8\%$ • $(900 - 72 =) 828$ OR $(828 + 72 =) 900$ • $(0.92 \times 900 =) 828$ • $(100 \times 828 \div (100 - 8) =) 900$ • $(100\% - 92\% =) 8\%$ 	<p>M1</p> <p>A1</p>	<p>A correct evaluation of an appropriate calculation implies 'Yes' irrespective of the box ticked</p> <p>Match 'A' mark to corresponding 'M' mark, i.e. 1st bullet points match, 2nd bullet points match, etc.</p>
<p>4(d) (Electricity cost is) $828 \times (\pounds)0.18$ $(\pounds)149.04$ or $14904(p)$</p> <p>(Cost of electricity and standing charge is $\pounds 149.04 + 65 =) (\pounds) 214.04$</p> <p>(Total bill including VAT at 5% $(\pounds)10.70(2)$ 1.05×214.04 or equivalent $(\pounds)224.74(2)$</p> <p>Organisation and communication</p> <p>Writing</p>	<p>M1</p> <p>A1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>OC1</p> <p>W1</p>	<p>Accept $828 \times 18(p)$</p> <p>If units are given they must be correct</p> <p>Accept $\pounds 149.04p$</p> <p>FT provided 828 used in a calculation for 'their cost of electricity'</p> <p>FT from 'their total of electricity and standing charge'</p> <p>Allow $(\pounds)224.75$</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>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.

<p>5(a) Sight of (\$) 12000</p> <p>(Tax at 20%) 0.20×12000 (= \$ 2400)</p>	<p>B1</p> <p>B1</p>	<p>Ignore £ for \$</p>
<p>5(b)</p> <p>(Tax at 25%) 0.25×3000 or $0.25 \times (25000 - 22000)$ or equivalent</p> <p style="text-align: right;">(\$) 750</p> <p>Total tax due (\$) 3150</p> <p>Refund due ($4000 - 3150$) (\$) 850</p>	<p>M2</p> <p>A1</p> <p>B1</p> <p>B1</p>	<p>Ignore £ for \$</p> <p>M1 for $25000 - 22000$ (= \$3000)</p> <p>CAO, not FT</p> <p>Allow for the correct sum of 2 amounts of tax derived from use of 20% and 25% rates</p> <p>FT 4000 – 'their derived 3150' provided 'their derived 3150' < 4000 and 'their derived 3150' ≠ 2400</p>
<p><i>5(b) Alternative method:</i></p> <p><i>Sight of 25000 – 22000 (= \$3000)</i></p> <p><i>25000 -</i> <i>(0.80 × 12000 + 0.75 × 3000 + 10000)</i></p> <p><i>Tax due (\$) 3150</i></p> <p><i>Refund due (\$) 850</i></p>	<p><i>B1</i></p> <p><i>M2</i></p> <p><i>A1</i></p> <p><i>B1</i></p>	<p><i>M1 for sight of</i> <i>0.80 × 12000 + 0.75 × 3000 + 10000</i></p> <p><i>FT 4000 – 'their derived 3150' provided 'their derived 3150' < 4000 and 'their derived 3150' ≠ 2400</i></p>
<p>6(a)(i) $\frac{300 \times 60}{2000}$ or $300 \div (2000 \div 60)$</p> <p>or $60 \div (2000 \div 300)$ or equivalent</p> <p style="text-align: center;">9 (minutes)</p>	<p>M1</p> <p>A1</p>	<p>May be seen in stages</p> <p>ISW</p> <p>Allow 9.1 (minutes) from premature approximation</p> <p>If no marks, awarded SC1 for an answer or sight of 3/20 or 0.15 (ignore units)</p>
<p>6(a)(ii) Assumption, e.g.</p> <p>'he was walking in a straight line',</p> <p>'no turning',</p> <p>'he didn't stop',</p> <p>'lawn mower didn't run out of petrol',</p>	<p>E1</p>	<p>Allow, e.g.</p> <p>'lawn mower goes the same distance as Emyr',</p> <p>'didn't push the mower faster than it was set',</p> <p>'didn't hold the lawn mower back',</p> <p>'Emyr kept going at a constant / same speed'</p> <p>Do not accept, e.g.</p> <p>'(lawn mower) kept going at a constant / same speed'</p> <p>'flat terrain',</p> <p>'Emyr can walk fast enough to keep up with the mower'</p>

<p>6(a)(iii) Impact, e.g. 'it could take longer to cut', 'more time needed', 'the answer is shorter than it will be',</p>	<p>E1</p>	<p>Strict FT from (a)(ii)</p> <p>Allow, e.g. 'longer (time)', 'increased (time)'</p> <p>Do not accept e.g. 'shorter (time)', 'could have been shorter or longer time', 'time could have been affected / impacted', 'it could vary'</p> <p>Do not accept contradictions</p>
<p>6(b)(4.5 litres for $25 \times 300 =$ 7500 (m)</p> <p>(Cutting 100 metre uses) $100 \times 4.5 \div 7500$ 0.06 (litres)</p>	<p>B1</p> <p>M1 A1</p>	<p>Allow for $(33.3... \times 9 \times 25 =)$ 7492.5 to 7500 (m)</p> <p>FT 'their 25×300'</p>
<p>6(b) <i>Alternative method:</i> $4.5 \div 25$ ($= 0.18$) $\times 100 \div 300$ 0.06 (litres)</p>	<p>M1 m1 A1</p>	<p>Allow use of $33.3(...) \times 9$ for 300 FT allowed use of $33.3(...) \times 9$ for 300 leading to an answer of 0.06(... litres)</p>
<p>6(c) Any of the following conversions</p> <ul style="list-style-type: none"> • 1 litre \approx 1.75 pints • 1 pint \approx 568 ml • 1 gallon = 8 pints AND 1 gallon \approx 4.5(46...) litres <p>OR 1 litre \approx 0.22 gallon</p> <p>Any of the following methods</p> <ul style="list-style-type: none"> • $1(.)3(0) \div 1.75$ • $1(.)3(0) \times 568 \div 1000$ • $\frac{1(.)3(0)}{8} \div 0.22$ • $\frac{1(.)3(0) \times 4.5(46...)}{8}$ <p>Answer in the range (£)0.73 to (£)0.74(3) or 73 to 74(.3p)</p> <p>AND Conclusion 'No'</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>Also accept the following <u>throughout</u>:</p> <ul style="list-style-type: none"> • 1 litre \approx 1.76 pints • 1 pint \approx 567 ml • 1 pint \approx 569 ml • 1 pint \approx 570 ml • 1 gallon = 8 pints AND 1 litre \approx 0.219 gallon <p>Accept £0.74(...)p Do not accept 0.73p, 0.74(...)p, £73 or £74</p> <p>Do not accept 'Yes' unless statement saying e.g. '74p is fairly close to 60p', i.e. a comparison stated</p>

<p>6(c) <i>Alternative method 1:</i> 1 litre \approx 1.75 pints OR 1 pint \approx 568 ml</p> <p>60 \times 1.75 OR 60 \times 1000 \div 568</p> <p>Answer in the range (£)1.05 or 105(p) to (£)1.06 or 106(p) AND conclusion 'No'</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>Also accept the following <u>throughout</u>:</p> <ul style="list-style-type: none"> • 1 litre \approx 1.76 pints • 1 pint \approx 567 ml • 1 pint \approx 569 ml • 1 pint \approx 570 ml <p>Accept £1.05p or £1.06p Do not accept £105 or £106 or 1.05p or 1.06p</p> <p>Do not accept 'Yes' unless statement saying e.g. '(£)1.05 is fairly close to (£)1.30', i.e. a comparison stated</p>
<p>6(c) <i>Alternative method 2:</i> 1 pint $>$ 0.5 litre or 2 pints $>$ 1 litre</p> <p>(But) 60 $<$ 130 \div 2 or 60 $<$ 65 or 2 \times 60 $<$ 130 or equivalent in £s</p> <p>Conclusion 'No'</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>May be expressed in words</p> <p>Accept 60p $<$ £1.30 \div 2 etc. with correct units included</p> <p>Do not accept 'Yes' unless statement saying e.g. '60(p) is fairly close to 65(p)', i.e. a comparison stated</p>
<p>6(d) 3000 metres</p>	<p>B1</p>	
<p>7(a) 1100</p>	<p>B1</p>	
<p>7(b) No or can't tell implied AND a reason, e.g. 'graph only gives data for 1st July', 'only shows bikes made on 1st July', 'only shows July not any other month', 'shows yearly not monthly', 'not any specified months', 'intermediate values have no meaning', 'don't know anything about the number of bikes made in December'</p>	<p>E1</p>	<p>Ignore additional incorrect statements</p> <p>Allow with no or can't tell implied, e.g. 'does not include months just the years as a whole', 'the graph is for July not December', 'shows bikes made on 1st July', 'shows July not any other month',</p> <p>Do not accept with no or can't tell implied, e.g. 'only 10 little square and there are 12 months', 'cannot fit it in the gaps', 'because it is the half way point', 'the graph is going up in years', 'cannot read the graph accurately', 'because it is grouped data',</p>
<p>7(c) 7</p>	<p>B1</p>	

<p>7(d) Idea that 4000 cycles is 80%</p> <p>$95 \times 4000 \div 80$ or 95×50 or equivalent 4750 (cycles)</p>	<p>S1</p> <p>M1 A1</p>	<p>Interpretation of link between 80% and 4000 cycles, e.g. sight of any one of the following, provided not with incorrect idea of using 20% or $(95 - 80 =) 15\%$</p> <ul style="list-style-type: none"> • $80\% = 4000$ (cycles) • $4000 \div (0.)80$ • $4000/(0.)80$
<p>7(e)(i) Midpoints 1500, 2500, 3500, 4500</p> <p>$1500 \times 3 + 2500 \times 12 + 3500 \times 9 + 4500 \times 7$ (= $4500 + 30\,000 + 31\,500 + 31\,500$ = 97500)</p> <p style="text-align: right;">$\div 31$</p> <p>3145(.16..cycles) or 3145.2 (cycles)</p>	<p>B1</p> <p>M1</p> <p>m1</p> <p>A1</p>	<p>FT 'their midpoints' provided each one lies within the appropriate group, including bounds throughout Use of lower bound gives 82 000 Use of upper bounds gives 113 000</p> <p>Use of lower bounds gives 2645(.16...) Use of upper bounds gives 3645(.16...)</p>
<p>7(e)(ii) $3000 \leq b < 4000$</p>	<p>B1</p>	
<p>8(a) (Change to CHF) 480×1.24 (No coins, so can buy only) 590 (CHF)</p> <p>(Cost to Amrit for 590 CHF is) $590 \div 1.24$ OR $480 - (595.2 - 590) \div 1.24$</p> <p style="text-align: right;">(£) 475.81</p>	<p>M1 A2</p> <p>M1</p> <p>A1</p>	<p>(= 595.2 CHF) A1 for an answer of 595(.2 CHF)</p> <p>FT 'their whole number multiple of 10 CHF' $\div 1.24$ or $595 \div 1.24$</p> <p>Depends only on previous M1 awarded Do not FT from $595 \div 1.24$ Must be to the nearest penny, do not accept (£)475.8(0)</p> <p>If no marks, due to consistent use of 1.28 then SC1 for sight of 610 CHF AND SC1 for (£)476.56</p>
<p>8(b) $310 \div 1.28$ (£) 242.19 or (£) 242.18(75)</p> <p>(Loss £250 - (£) 242.19 =) (£) 7.81(25)</p>	<p>M1 A1</p> <p>A1</p>	<p>Do not accept (£) 242.2(0)</p> <p>FT 250 – 'their (£) 242.19' (use of £242.18 leads to £7.82) Mark final answer, i.e. not accepting rounding final answer to (£)7.80</p>
<p>8(b) <i>Alternative method:</i> $250 \times (1.28 - 1.24)$ (= 10 CHF) $\div 1.28$ (£) 7.81(25)</p>	<p>M1 m1 A1</p>	<p>Mark final answer, i.e. not accepting rounding final answer to (£)7.80</p>

<p>9(a) (Perpendicular height, h) $(h^2 =) 1.8^2 - 0.7^2$ or $1.8^2 = h^2 + 0.7^2$ $h^2 = 2.75$ or $(h =) \sqrt{2.75}$ (Perpendicular height is) $h = 1.658(\dots\text{m})$ or 1.66 (m) or 1.7 (m)</p> <p>(Volume of Luned's tent =) $\frac{1}{2} \times (0.7+0.7) \times 1.658\dots \times 2.5$ or equivalent</p> <p>(Volume) Answer in the inclusive range 2.9 (m³) to 2.98(m³) or $3(.0\text{m}^3)$</p>	<p>M1</p> <p>A1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>Accept $\sqrt{11}/2$ Accept $\sqrt{11}/2$ Do not accept truncation to 1.6(m) or 1.65 (m) (But FT allowed) FT from M1, A0 for the correctly evaluated square root of 'their 2.75' provided 'their answer' <1.8 (m)</p> <p>FT 'their derived 1.658(...)' provided $\neq 1.8$ or $\neq 0.7$</p> <p>Check from correct working (in particular for an answer of $3(\text{m}^3)$) FT 1.6m or 1.65m to an answer in the range $2.8(\text{m}^3)$ to $2.89(\text{m}^3)$ FT from previous M1 awarded for a similar range</p>
<p>9(b) $200\,000\text{ cm}^3$</p>	<p>B1</p>	
<p>10(a) (Volume =) $9450 \div 2.7$</p> <p style="text-align: center;">3500 (cm³)</p>	<p>M2</p> <p>A1</p>	<p>M1 for $\frac{9450}{2.7} = 2.7$ Volume</p> <p>CAO If no marks, award SC1 for an answer of either (steel $9450 \div 7.8 =$) $1211(.5\dots\text{cm}^3)$ or 1212 (cm³) or (carbon fibre $9450 \div 1.6 =$) $5906(.25\text{ cm}^3)$</p>
<p>10(b) (Mass =) 1.6×3500 or $1.6 \times 9450 \div 2.7$</p> <p style="text-align: center;">5600 (g)</p>	<p>M2</p> <p>A1</p>	<p>M1 for $\frac{\text{Mass}}{3500} = 1.6$ 3500 FT 'their 3500' throughout provided $\neq 9450$ Do not allow a FT answer of $9450(\text{g})$</p>
<p>11(a) 650 (steps)</p>	<p>B1</p>	
<p>11(b) $(x =) \tan^{-1} \frac{324}{800}$</p> <p style="text-align: center;">$(x =) 22(.047\dots^\circ)$</p>	<p>M2</p> <p>A1</p>	<p>OR alternative full method (Pythagoras' Theorem followed by relevant trigonometry) (Note: Hypotenuse is $863.1\dots\text{m}$) M1 for $\tan x = 324/800$ OR for statement of 'their trig ratio', with values substituted, from alternative full method</p> <p>CAO</p>