GCSE MARKING SCHEME

AUTUMN 2018

GCSE
MATHEMATICS – NUMERACY
UNIT 2 - INTERMEDIATE TIER
3310U40-1

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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.

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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 × 0.22 (£)35.88	M1 A1	Or equivalent (46 - 10.12)
1(a)(ii) $\frac{5}{8}$×43.6(0) or 43.6(0) – $\frac{3}{8}$×43.6(0) (£)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 *If no marks in (i) and (ii), award SC1 in (ii) for answers of (£)10.12* ***and*** *(£)16.35 respectively*
1(b) $\frac{6}{43}$	B1	

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<table>
<tr><td>2. Red paint 500ml 1 tin</td><td>B1</td><td>Allow Red paint 250ml with 2 tins</td></tr>
<tr><td>(250 ÷ 5) × 200 or 50 × 200 or 40 × 250 or 20 × 500 or equivalent calculation that could lead to 10 000
OR
sight of 40 : 2 : 1 or equivalent
(not 200 : 10 : 5 alone)</td><td>M1</td><td>FT 20 × ‘their quantity of red paint’ from the table</td></tr>
<tr><td>10 000 ml white paint</td><td>A1</td><td>OR 10 litres</td></tr>
<tr><td>White paint 1 litre 10 tins</td><td>A2</td><td>CAO
A1 for any one of
• 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</td></tr>
<tr><td>12 tins of paint altogether</td><td>B1</td><td>CAO must from sum of 1 + 1 + 10 with evidence of 10 000 ml white paint

Award SC marks as detailed:
Total amount of paint, use of 250 ml tins:
<table>
<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>
Overall marks are B0, M1, A1 and <u>SC2</u>

Total amount of paint, use of 500 ml tins:
<table>
<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>
Overall marks are B1, M1, A1 and <u>SC1</u></td></tr>
</table>

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3. (Tablets £) (55 + 48) × 220 (= £ 22660) (Covers £) (48 + 14) × 18 (= £1116) (£) 23 776	M1 M1 A1	Allow with missing brackets Allow with missing brackets CAO
3. Alternative method: *55×220 + 48×(220 + 18) + 14×18* *(= 12 100 + 11424 + 252)* *OR* *55×220 + 48×220 + 48×18 + 14×18* *(= 12 100 + 10560 + 864 + 252)* *(£) 23 776*	*M2* *A1*	Allow with missing brackets *M1 for:* *Sight of any 1 of the following:* • *55×220 + 14×18* • *48×(220 + 18)* • *12 100, 10560, 864 and 252* • *12100, 11424 and 252* *CAO*
4(a) Profit: sight of 5% or 18/360 or 1/20 or 0.05 Any of the following methods, or equivalent • 0.05 × 9100 (million) • 0.05 × 9 100 000 000 • 9100 (million) – 0.95 × 9100 • 9100 000 000 – 0.95 × 9100 000 000 (£) 455 (million)	B1 M1 A1	Allow for sight of 16/360 to 20/360 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 × 9100(0....) Do not allow for 5% **of** 9100 (million) or equivalent seen without convincing working or an answer implying '×' has been used CAO mark final answer, this being the answer line if completed Allow for (£) 455 000 000 (including in the answer space)
4(b) 370 000	B1	

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4(c) Any one of: • $\frac{(900 – 828)}{900}$ (× 100 = 8%) • 0.08 × 900 (=72) • 0.92 × 900 (= 828) • 100 × 828 ÷ (100 - 8) (= 900) • 828 ÷ 900 (×100) (= 0.92 (92%))	M1	
Indicates or implies 'Yes' AND as appropriate: • ($\frac{(900 – 828)}{900}$ × 100 =) 8% • (900 – 72 =) 828 OR (828 + 72 =) 900 • (0.92 × 900 =) 828 • (100 × 828 ÷ (100 - 8) =) 900 • (100% - 92% =) 8%	A1	A correct evaluation of an appropriate calculation implies 'Yes' irrespective of the box ticked Match 'A' mark to corresponding 'M' mark, i.e. 1st bullet points match, 2nd bullet points match, etc.
4(d) (Electricity cost is) 828 ×(£)0.18 (£)149.04 or 14904(p)	M1 A1	Accept 828 × 18(p) If units are given they must be correct Accept £149.04p
(Cost of electricity and standing charge is £149.04 + 65 =) (£) 214.04	B1	FT provided 828 used in a calculation for 'their cost of electricity'
(Total bill including VAT at 5% (£10.70(2)) 1.05 × 214.04 or equivalent (£)224.74(2)	M1 A1	FT from 'their total of electricity and standing charge' Allow (£)224.75
Organisation and communication	OC1	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
Writing	W1	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.

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

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6(a)(iii) Impact, e.g. 'it could take longer to cut', 'more time needed', 'the answer is shorter than it will be',	E1	Strict FT from (a)(ii) Allow, e.g. 'longer (time)', 'increased (time)' Do not accept e.g. 'shorter (time)', 'could have been shorter or longer time', 'time could have been affected / impacted', 'it could vary' Do not accept contradictions
6(b)(4.5 litres for 25 × 300=) 7500 (m) (Cutting 100 metre uses)100 × 4.5 ÷ 7500 0.06 (litres)	B1 M1 A1	Allow for (33.3... × 9 × 25 =) 7492.5 to 7500 (m) FT 'their 25 × 300'
6(b) Alternative method: *4.5 ÷ 25 (= 0.18)* *× 100 ÷ 300* *0.06 (litres)*	*M1* *m1* *A1*	 *Allow use of 33.3(...) × 9 for 300* *FT allowed use of 33.3(...) × 9 for 300 leading to an answer of 0.06(... litres)*
6(c) Any of the following conversions • 1 litre ≈ 1.75 pints • 1 pint ≈ 568 ml • 1 gallon = 8 pints **AND** 1 gallon ≈ 4.5(46...) litres OR 1 litre ≈ 0.22 gallon Any of the following methods • 1(.)3(0) ÷ 1.75 • 1(.)3(0) × 568 ÷ 1000 • $\frac{1(.)3(0) \div 0.22}{8}$ • $\frac{1(.)3(0) \times 4.5(46...)}{8}$ Answer in the range (£)0.73 to (£)0.74(3) or 73 to 74(.3p) **AND** Conclusion 'No'	B1 M1 A1	Also accept the following throughout: • 1 litre ≈ 1.76 pints • 1 pint ≈ 567 ml • 1 pint ≈ 569 ml • 1 pint ≈ 570 ml • 1 gallon = 8 pints **AND** 1 litre ≈ 0.219 gallon Accept £0.74(...)p Do not accept 0.73p, 0.74(...)p, £73 or £74 Do not accept 'Yes' unless statement saying e.g. '74p is fairly close to 60p', i.e. a comparison stated

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6(c) Alternative method 1: *1 litre ≈ 1.75 pints OR 1 pint ≈ 568 ml* *60 × 1.75 OR 60 × 1000 ÷ 568* *Answer in the range* *(£)1.05 or 105(p) to (£)1.06 or 106(p)* ***AND** conclusion 'No'*	 *B1* *M1* *A1*	*Also accept the following <u>throughout</u>:* • *1 litre ≈ 1.76 pints* • *1 pint ≈ 567 ml* • *1 pint ≈ 569 ml* • *1 pint ≈ 570 ml* *Accept £1.05p or £1.06p* *Do not accept* *£105 or £106 or 1.05p or 1.06p* *Do not accept 'Yes' unless statement saying e.g. '(£)1.05 is fairly close to (£)1.30', i.e. a comparison stated*
6(c) Alternative method 2: *1 pint > 0.5 litre or 2 pints > 1 litre* *(But) 60 < 130 ÷ 2 or 60 < 65* *or 2 × 60 < 130 or equivalent in £s* *Conclusion 'No'*	 *B1* *M1* *A1*	 *May be expressed in words* *Accept 60p < £1.30 ÷ 2 etc. with correct units included* *Do not accept 'Yes' unless statement saying e.g. '60(p) is fairly close to 65(p)', i.e. a comparison stated*
6(d) 3000 metres	B1	
7(a) 1100	B1	
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'	E1	Ignore additional incorrect statements 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', 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',
7(c) 7	B1	

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7(d) Idea that 4000 cycles is 80% 95 × 4000 ÷ 80 or 95 × 50 or equivalent 4750 (cycles)	S1 M1 A1	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% • 80% = 4000 (cycles) • 4000 ÷ (0.)80 • 4000/(0.)80
7(e)(i) Midpoints 1500, 2500, 3500, 4500 1500×3 + 2500×12 + 3500×9 + 4500×7 (= 4500 + 30 000 + 31500 + 31500 = 97500) ÷ 31 3145(.16..cycles) or 3145.2 (cycles)	B1 M1 m1 A1	 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 Use of lower bounds gives 2645(.16...) Use of upper bounds gives 3645(.16...)
7(e)(ii) 3000 ≤ *b* < 4000	B1	
8(a) (Change to CHF) 480 × 1.24 (No coins, so can buy only) 590 (CHF) (Cost to Amrit for 590 CHF is) 590 ÷ 1.24 OR 480 - (595.2 – 590) ÷ 1.24 (£) 475.81	M1 A2 M1 A1	(= 595.2 CHF) A1 for an answer of 595(.2 CHF) FT 'their whole number multiple of 10 CHF' ÷ 1.24 or 595 ÷ 1.24 Depends only on previous M1 awarded Do not FT from 595 ÷ 1.24 Must be to the nearest penny, do not accept (£)475.8(0) If no marks, due to **consistent** use of 1.28 then SC1 for sight of 610 CHF AND SC1 for (£)476.56
8(b) 310 ÷ 1.28 (£) 242.19 or (£) 242.18(75) (Loss £250 - (£) 242.19 =) (£) 7.81(25)	M1 A1 A1	 Do not accept (£) 242.2(0) 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
8(b) Alternative method: *250 × (1.28 – 1.24) (= 10 CHF)* *÷ 1.28* *(£) 7.81(25)*	*M1* *m1* *A1*	 *Mark final answer, i.e. not accepting rounding final answer to (£)7.80*

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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(...m) or 1.66 (m) or 1.7 (m) (Volume of Luned's tent =) ½ × (0.7+0.7) × 1.658.... × 2.5 or equivalent (Volume) Answer in the inclusive range 2.9 (m^3) to 2.98(m^3) or 3(.0m^3)	M1 A1 A1 M1 A1	 Accept √11⁄2 Accept √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) FT 'their derived 1.658(....)' provided ≠1.8 or ≠0.7 Check from correct working (in particular for an answer of 3(m^3)) FT 1.6m or 1.65m to an answer in the range 2.8(m^3) to 2.89(m^3) FT from previous M1 awarded for a similar range
9(b) 200 000 cm^3	B1	
10(a) (Volume =) 9450 ÷ 2.7 3500 (cm^3)	M2 A1	M1 for $\frac{9450}{\text{Volume}} = 2.7$ CAO If no marks, award SC1 for an answer of either (steel 9450 ÷ 7.8 =) 1211(.5...cm^3) or 1212 (cm^3) or (carbon fibre 9450 ÷ 1.6 =) 5906(.25 cm^3)
10(b) (Mass =) 1.6 × 3500 or 1.6 × 9450 ÷ 2.7 5600 (g)	M2 A1	M1 for $\frac{\text{Mass}}{3500} = 1.6$ FT 'their 3500' throughout provided ≠ 9450 Do not allow a FT answer of 9450(g)
11(a) 650 (steps)	B1	
11(b) (x =) $\tan^{-1} \frac{324}{800}$ (x =) 22(.047...°)	M2 A1	OR alternative **full** method (Pythagoras' Theorem followed by relevant trigonometry) (Note: Hypotenuse is 863.1... m) M1 for tan x = 324/800 OR for statement of 'their trig ratio', with values substituted, from alternative full method CAO

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