GCSE MARKING SCHEME

AUTUMN 2018

GCSE
MATHEMATICS – NUMERACY
UNIT 1 - INTERMEDIATE TIER
3310U30-1

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 (3310U30-1)

AUTUMN 2018 MARK SCHEME

GCSE Mathematics – Numeracy Unit 1: Intermediate Tier	**Mark**	**Comment**
1(a) 4 (cm), 5 (cm) and 6 (cm) in any order	B1	
1(b) $4 \times 4 + 4 \times 5 + 4 \times 6$ or equivalent 60 (cm) $3 \times 60 \div 2$ or equivalent 90 (p) or £0.9(0)	M1 A1 M1 A1	FT 'their width, height and length' provided 3 values are used FT 1.5 × 'their 60 (cm)' (irrespective if dimensionally incorrect) provided derived from use of 'their 3 values' Depends on both M marks Allow £0.90p
1(b) Alternative method: *4×1.5, 5×1.5 and 6×1.5* *6(p), 7.5(p) and 9(p)* *4 ×(6 + 7.5 + 9)* *90(p) or £0.9(0)*	*M1* *A1* *M1* *A1*	*FT 'their width, height and length' provided 3 values are used* *FT use of 'their 6, 7.5 and 9'* Allow £0.90p *Accept FT rounded or truncated to pence, may be expressed in £s*
2(a)(i) 3	B1	
2(a)(ii) 2	B1	
2(b) Idea that 5 books weigh 1750 (g) 350 (g)	B1 B1	ISW
2(c)(i) $10x = 2x + 3200$ or $8x = 3200$ or $x = 3200 \div 8$ or equivalent	B1	ISW, although allow x = 8/3200 if followed by x = 400. B0 for x = 8/3200 or '400' alone Allow x = 400 Accept inclusion of unit 'g' throughout Do not accept x = 1/8 of 3200
2(c)(ii) $12 \times 3200 \div (10 - 2)$ or equivalent shown in stages 4800 (g)	M1 A1	FT from 'their first equation' in the form $ax = bx + c$

<table>
<tr><td>3(a) Method of comparison, e.g. per 1 tile or for 5 tiles, or similar</td><td>M1</td><td>Needs to show attempt to compare at least 2 of the 3 packages, e.g.
Comparing 100 tiles:
100 tiles for £29 with
• 40 tiles: £11.20 × 2.5 (= £28), or
• 25 tiles: £7.50 × 4 (= £30)</td></tr>
<tr><td>Correctly evaluated comparison for 2 of the 3 packages</td><td>A1</td><td>Ignore incorrect units
<table><tr><td>Number of tiles</td><td>per 1 tile</td><td>per 5 tiles</td><td>per 200 tiles</td></tr><tr><td>25</td><td>30 p</td><td>£1.50</td><td>£60</td></tr><tr><td>40</td><td>28 p</td><td>£1.40</td><td>£56</td></tr><tr><td>100</td><td>29 p</td><td>£1.45</td><td>£58</td></tr></table>
<table><tr><td>Number of tiles</td><td colspan="3">Tiles per pence</td></tr><tr><td>25</td><td>25/750</td><td>1/30</td><td>0.0333...</td></tr><tr><td>40</td><td>40/1120</td><td>1/28</td><td>0.0357...</td></tr><tr><td>100</td><td>100/2900</td><td>1/29</td><td>0.03448...</td></tr></table>(× 100 for tiles per £)</td></tr>
<tr><td>Correctly evaluated comparison for all packages, may be different methods for different stages</td><td>A1</td><td>If units are given they must be correct
Consistent units that are not obviously incorrect are required, or allow no units given
Depends on at least M1, A1 previously awarded</td></tr>
<tr><td>Conclusion ‘(box of) 40 (middle) is best value for money’</td><td>E1</td><td>FT provided all three boxes are appropriately compared (all three or as two pairs) and at least M1 A1 previously awarded

Sight of looking at the difference in costs is likely to be M0 A0 A0</td></tr>
<tr><td>Organisation and communication</td><td>OC1</td><td>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</td></tr>
<tr><td>Writing</td><td>W1</td><td><u>Do not penalise incorrect units, only consider if units are not given</u>

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.</td></tr>
</table>

3(b) Working with 3m by 4m: • 30 tiles by 20 tiles, or • 15 tiles by 40 tiles 600 (tiles)	M2 A1	Ignore further inappropriate working M1 clearly showing (accepting shown on a diagram) any one of • 300 ÷ 10 = 30 • 300 ÷ 20 = 15 • 400 ÷ 10 = 40 • 400 ÷ 20 = 20 CAO If no marks, award SC1 for a misuse of units with • division of 10 **and** 20 by 3 **and** 4 in either order, or • 10 × 20 divided by 3 × 4
3(b) Alternative method: *12 (m^2) ÷ 0.02 (m^2) or* *120000 (cm^2) ÷ 200 (cm^2) or* $\frac{300 \times 400}{10 \times 20}$ *600 (tiles)*	*M2* *A1*	*Change areas to consistent units* *M1 for 10 × 20 = 200 AND* *3(00) × 4(00) = 12(0000)* *or 3 × 4 = 12 AND 0.1 × 0.2 = 0.02* *CAO*
3(c) Selecting the 3 boxes: A (Square) B (Rhombus) D (Right-angled triangle)	B2	In any order B1 for selecting 2 of the 3 correct boxes B0 for selecting more than 3 boxes
4(a)(i) 10(%) and 40(%) in either order 5(%)	B1 B1	
4(a)(ii) A suitable explanation based on any one of: • no correlation • no **data** for towns above 7000 • small sample e.g. 'no correlation', 'no pattern (to the results)', 'no relationship (between the number of people and the percentage of rubbish)'	E1	Accept, e.g. 'outside the range of data collected', 'only data between 2000 to 7000 people', 'results vary too much', 'the data stops at 7000' Allow, e.g. 'not enough data', 'no data for a town this **big**', 'was **only** done for first week in July', 'there are **only** 8 towns' Do not accept, e.g. 'no town with 9000 people', 'no data at 9000 people', 'it is off the graph', 'graph doesn't reach 9000 people', 'not suitable', 'may not be accurate', 'unpredictable', 'no data for 8000', 'each town is different', 'no data for a town of this size', '9000 is not a small town'

<table>
<tr><td>4(b) 130 230 × 4 or equivalent
520 920 (tonnes)</td><td>M1
A1</td><td>For sight of appropriate calculation</td></tr>
<tr><td>5(a)(i) Listing common multiples showing at least:
• 42, 84 and
• 24, 48,72
OR 2×3×7 (=42) AND 2×2×2×3 (=24)

Complete listing:
• 42, 84, 126, 168 and
• 24, 48,72, 96, 120, 144, 168
OR LCM 2 × 2 × 2 × 3 × 7 (= 168)
(= 4 × 42 and 7 × 24)</td><td>B1

B1</td><td>Accept 6 × 7 (=42) AND 4 × 6 (=24), i.e. must have sight of factors which could lead to LCM being given, so do not accept e.g. 2 × 21 and 2 × 12 without further breakdown

Accept 6 × 4 × 7 or 6 × 2 × 2 × 7

If no marks, award SC1 for sight of
4 × 42 = 168 AND 7 × 24 = 168
(as least not shown), or indication that number of buttons and pins both 168</td></tr>
<tr><td>5(a)(ii) 168</td><td>B1</td><td>CAO</td></tr>
<tr><td>5(b)(i) (Sticky tape needed is)
2.5 × 4 × 42 or 2.5 × 7 × 24 or 2.5 × 168
(= 420 cm)
(Number of rolls of sticky tape is)
(2.5×4×42) ÷ 60 or (2.5×7×24) ÷ 60
or (2.5×168) ÷ 60 or 420 ÷ 60
7 (rolls needed)</td><td>M1

M1

A1</td><td>FT ‘their 168’ from (a)(ii)

FT ‘their 168’ from (a)(ii)
Allow sight of repeated addition of 60s, need to show 60, 120, 180, 240, 300
Only FT if number of rolls is >1
Must be rounded up to a whole number of rolls

Allow 2.5cm rounded to 2cm or 3cm, FT as with use of 2.5cm
<table>
<tr><td>Use of 2cm</td><td>Use of 3cm</td><td></td></tr>
<tr><td>2×168
(= 336 cm)</td><td>3×168
(= 504cm)</td><td>M1</td></tr>
<tr><td>336 ÷ 60</td><td>504 ÷ 60</td><td>M1</td></tr>
<tr><td>6 (rolls)
(5.6 rolls)</td><td></td><td>A0</td></tr>
<tr><td></td><td>8 or 9 (rolls)
(8.4 not accepted)</td><td>A1</td></tr>
</table>
(As 3cm is already rounded up, allow number of rolls rounded down)</td></tr>
</table>

<table>
<tr><td>5(b)(i) Alternative method:
60 ÷ 2.5 (= 24 badges per roll of tape)
(Number of rolls of sticky tape is)
168 ÷ (60 ÷ 2.5) or 168 ÷ 24
7 (rolls needed)</td><td>M1
M1

A1</td><td>FT 'their 168' from (a)(ii)

Only FT if number of rolls is >1
Must be rounded up to a whole number of rolls

Allow 2.5cm rounded to 2cm or 3cm, FT as with use of 2.5cm
<table>
<tr><td>Use of 2cm</td><td>Use of 3cm</td><td></td></tr>
<tr><td>60 ÷ 2 (= 30)</td><td>60 ÷ 3 (= 20)</td><td>M1</td></tr>
<tr><td>168 ÷ 30</td><td>168 ÷ 20</td><td>M1</td></tr>
<tr><td>6 (rolls)
(5.6 rolls)</td><td></td><td>A0</td></tr>
<tr><td></td><td>8 or 9 (rolls)
(8.4 not accepted)</td><td>A1</td></tr>
</table>
(As 3cm is already rounded up, allow number of rolls rounded down)</td></tr>
<tr><td>5(b)(ii) Takings (50(p) × 168=)
(£)84 or 8400(p)

Costs 4×(£) 2.50 + 7×(£)1.10
+ 7 × 52(p)

(=£10 + £7.70 + £3.64 =)
(£) 21.34

Profit (£84 – £21.34 =)
(£) 62.66</td><td>B1

M1
M1

A1

B1</td><td>FT 'their 168' from (a)(ii)

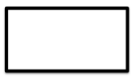
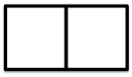
FT from (b)(i) 'their number of rolls' × 52p provided >1

If units are given they must be correct
FT £17.70 + 52p × 'their number of rolls', for any number of rolls

FT 'their 84' provided 50(p) × 'their 168' attempted and 'their (£)21.34' provided at least M1 previously awarded</td></tr>
<tr><td>6(a) 245°</td><td>B1</td><td></td></tr>
<tr><td>6(b) 150°</td><td>B1</td><td></td></tr>
<tr><td>6(c)(i) 17:30</td><td>B1</td><td></td></tr>
<tr><td>6(c)(ii) 22:10</td><td>B1</td><td></td></tr>
<tr><td>7. a = 55°
b = 76°
c = 104°
d = 104°</td><td>B1
B1
B1
B1</td><td>

FT 180° - 'their b'
FT 180° - 'their b' or FT 'their c'</td></tr>
<tr><td>8(a) 13 to 18</td><td>B1</td><td>Do not accept if '13 to 18' and '8' both given in response, allow '13 to 18' with '(8)'</td></tr>
</table>

8(b) '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
8(c) Shows more than 3 groups between 1 and 18, which are: • non-overlapping • exhaustive groups	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. • 'men, women, children' or • sizes listed without groups for the number of pairs Ignore inclusion of number of people shown in their groups
9(a) (Jade saves each week) 72 × 0.21 or 7.2(0) + 7.2(0) + 0.72 (= £ 15.12) (Total savings 15.12) × 20 (£) 302.4(0) (Jade's father pays £350 – 302.40 =) (£) 47.6(0)	M1 M1 A1 B1	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. 72 × 20 (=1440), followed by × 0.21 CAO FT 'their £302.40' provided • a percentage calculation using 72 has been involved AND • provided their answer is < (£) 350
9(b)(i) 65 000 cm^3	B1	
9(b)(ii) $100 - \frac{3}{25} \times 100$ or $\frac{(25-3)}{25} \times 100$ 88(%)	M1 A1	Or equivalent Allow M1 for 88/100 If no marks, award SC1 for an answer of or sight of 12(%) provided it is not from incorrect working
9(b)(iii) $abc + \pi a^2 c$	B1	

9(c) 35 × 9 ÷ 45 or 35 ÷ 5 or equivalent 7 (cm) or 70 mm	M1 A1	Allow with incorrect place value from conversion of units CAO. Do not accept an answer of: • 70 without units (mm) • 7 or 70 with incorrect units
10(a)  or  in any orientation	B1	Allow intention of straight lines and right angles Do not accept if clearly two parallelograms attached rather than rectangles If the roof is split into two rectangles, they must meet along one side and intention must be to draw two identical rectangles (or squares)
10(b) Sight of any of the following: • 4.2 × 50000(cm) • 210 000 • 4.2 × 500 (m) • 1 cm = 0.5 **km** • 2cm = 1 km • an answer to a product involving 4.2× ... with leading digits '21' 210 000 (cm) ÷ 100 ÷ 1000 or 4.2 × 0.5 or equivalent calculation that would lead to a correct answer (2.1km) 2.1 (km)	B1 M1 A1	Ignore inclusion of incorrect units, allow intention of × 4.2 by 50000 given, i.e. allow if leading digits '21' seen FT 'their 4.2 × 50000' ÷ 100 ÷ 1000 evaluated incorrectly CAO
10(c) Correct pair of arcs (or arc) cutting the road appropriately Correct use of these arc intersections to create a pair of intersecting arcs Correct placement of the new turbine shown Correct evaluation of appropriate measurement ÷ 2 3.5 (km) to 3.7(km)	 B1 B1 B1 B1	<u>Tolerance of ± 2 mm throughout</u> <u>Alternative for 1st two B1s:</u> B2 for arcs towards drawing a kite, e.g. from B and C with radii AB and AC respectively (no B1 possible) Allow this mark if arcs not shown, or spurious arcs seen. Allow for sight of intersection of a straight line with the road If B0, B0, B0 award SC1 for correct construction with arcs shown for the perpendicular bisector of the Bryn to Cwm road, then FT for possible final B1 Allow this mark if arcs not shown, or spurious arcs seen. *(Note: if perpendicular bisector is drawn the final distance is 3.3 km to 3.5 km)*

<table>
<tr><td>11(a) Uniform scale from at least 5 (seconds) to at least 65 (seconds), AND time label

Correct format of a box-and-whisker

Showing least time 5 seconds

Showing UQ 55 seconds

Correct plotting upper end whisker at 65 seconds, LQ at 23 seconds AND median at 45 seconds</td><td>B1

B1

B1

B1

B1</td><td>Accept ‘seconds’ as the time label, do not accept if only attached to values on the scale

Do not ignore additional lines drawn
End stopper lines omitted can be ignored

FT for unambiguous indications of the following:

On the graph paper

On the graph paper

On the graph paper</td></tr>
<tr><td>11(b) 0.75 × 240 or equivalent
180 (text messages)</td><td>M1
A1</td><td>Allow sight of ‘75% of 240’

If no marks, award SC1 for an answer of 60 (text messages)</td></tr>
<tr><td>12(a) (96 ÷ 8 =) 12
or 96 ÷ 12 = 8 or 8 × 12 = 96

<table><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></td><td>B1

B1</td><td>May be implied by consistent position pattern +12 indicated

CAO

Sight of 12 for voucher 2 with no further working or entries is B0, B0</td></tr>
<tr><td>12(b) 100 × 120 ÷ 80 or equivalent
(£) 150</td><td>M1
A1</td><td></td></tr>
</table>