GCSE MARKING SCHEME

AUTUMN 2016

MATHEMATICS - NUMERACY (NEW)
UNIT 1 - INTERMEDIATE TIER

3310U30-1

INTRODUCTION

This marking scheme was used by WJEC for the 2016 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.

GCSE Mathematics – Numeracy Unit 1: Intermediate Tier Autumn 2016	Mark	Comment
1(a) 14 520 (square yards)	B1	
1(b) Method, e.g. using readings for 2.5 and 3 acres or 5.5 × reading for 1 acre	M1	e.g. sight of 12100 + 14520, or 5.5 × 4840, 12100 + 12100 + 2420, or 9680 + 9680 + 4840 + 2420 in working: i.e. sight of any calculation that could lead to a correct answer FT e.g. 12100 + 'their 14520'
26 620 (square yards)	A1	FT 'their 14520' used correctly

<table>
<tr><th>GCSE Mathematics – Numeracy
Unit 1: Intermediate Tier
Autumn 2016</th><th>Mark</th><th>Comment</th></tr>
<tr><td>2(a) Method of comparison, e.g. per 100 ml or for 6000 ml, or divide the cost of 300 ml by 3 and multiply by 4 or 5, or similar</td><td>M1</td><td>Needs to show attempt to compare at least 2 of the 3</td></tr>
<tr><td>Correctly evaluated comparison for 2 of the 3 sizes</td><td>A1</td><td>Ignore incorrect units
<table><tr><th></th><th>per 100 ml</th><th>per 6000 ml</th></tr><tr><td>300 ml</td><td>22 p</td><td>£13.20</td></tr><tr><td>400 ml</td><td>23 p</td><td>£13.80</td></tr><tr><td>500 ml</td><td>25 p</td><td>£15</td></tr></table></td></tr>
<tr><td>Correctly evaluated comparison for all sizes, may be different methods for different stages, AND conclusion ‘300 ml (small) bottle is best value for money’</td><td>A1</td><td>Consistent units that are not obviously incorrect are required, or allow no units given
Comparison of small with large then medium with large is not a full comparison of all 3

Examples:
Comparing small and medium at 1200 ml and then small and large at 1500 ml, possible M1, A1, A1

Insufficient, 100 ml is 22p, so 500 ml is £1.10 (ignoring medium size bottle) so the small one is cheaper, possible M1 A1 A0, or
sight of 2 small bottles is only 7p more than the big bottle for an extra 100 ml is likely to be M0 A0 A0</td></tr>
<tr><td>Organisation and communication</td><td>OC1</td><td>Organisation and communication
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>Accuracy of writing</td><td>W1</td><td>Accuracy of writing
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 need, etc.</td></tr>
<tr><td>2(b)
2 (medium) bottles of 400 ml for (£)1.84 or 184(p)</td><td>B1</td><td>Penalise incorrect units -1 only once
Allow £1.84p</td></tr>
<tr><td>300ml (small) bottle and 500ml (large) bottle for (£)1.91 or 191(p)</td><td>B1</td><td>Allow £1.91p</td></tr>
<tr><td>Two 400ml (medium) bottles AND states 'cheaper'</td><td>B1</td><td>Depends on at least B1 previously awarded and both of these options have been considered

Example:
Costs per 100ml (22p, 23p & 25p) are used leading to comparison of 800ml as 176p, 184p and 200p or equivalent, with smallest selected as the best option, is B1, B0, B0</td></tr>
</table>

GCSE Mathematics – Numeracy Unit 1: Intermediate Tier Autumn 2016	Mark	Comment
3(a) A statement regarding e.g. Q1: 'not relevant', 'confidentiality', 'too personal', 'inappropriate question', 'it isn't about where you live'	B1	For any one equivalent statement. Ignore additional comments. Do not accept 'no option boxes given', 'too open ended', 'no space to answer'
Q2: 'times not exclusive', 'no period of time given', '10 times in 2 boxes', 'doesn't say if it is in a week', 'it is vague (as it doesn't say in a month)'	B1	For any **one** of these, or equivalent statement. Ignore additional comments. *SC1 if <u>both</u> correct but in reverse order.*
3(b) A criticism regarding • location ((biased on DVD shelves) in the supermarket) • poor distribution method • does not target teenagers	B1	For any **one** of these, or equivalent statement. Ignore additional comments. Accept 'may not be seen on the shelves', 'better if left at the checkout', 'wasn't asked verbally', 'should have been handed out', 'no guarantee anyone would answer them' Do not accept 'some teenagers don't watch DVDs', 'teenagers watch online'
4(a) 034° ± 2°	B1	Do not accept 34° ± 2° Allow N34°E ± 2°
4(b) Llangurig	B2	B1 for an answer of Llanidloes
4(c)(i) An answer in the range 8 to 11 miles inclusive	B1	
4(c)(ii) 5 × 40 ÷ 8	M1	Accept evidence of 40 ÷ 1.6 For this question accept use of 3 miles is approximately 5km, with an equivalent calculation 3 × 8
25 miles	A1	For this question FT from 3 miles is approximately 5km to give an answer of 24(miles) Accept unsupported answers of 24(km) and 25(km)
Aberystwyth	A1	Unsupported answer of Aberyswyth is M0, A0, A0 It is possible to award the final A1 from M1, A0, but not from M0
4(d) 3 cm represents 30 000 cm or 3 : 30 000 or sight of 3×100	M1	Allow sight of (3cm is) 30000
300 (m)	A1	An answer of 30 000 is awarded M1, A0

GCSE Mathematics – Numeracy Unit 1: Intermediate Tier Autumn 2016	Mark	Comment
5(a)(i) 44%	B1	
5(a)(ii) 31%	B1	
5(b)(i) Conclusion (stated or implied) and reason, e.g. 'Yes, (as marks of 2 girls and boys are the same, but) marks for 3 boys are better than the marks of the other 3 girls', 'No, as there is insufficient data'	E1	The conclusion (e.g. yes/no/can't) MUST match the reason given Accept 'no, as she has plotted one score incorrectly' or similar, i.e. accept 'no' if followed by a reasonable explanation Accept 'yes as some boys had higher marks in English', 'Girls marks 10, 20, 33, 50, 70 and boys marks 10, 20, 35, 60, 75 so yes boys do better', 'yes as boys scored (17) more overall than girls', 'yes as the first 2 are the same, but the last ones are higher', 'yes, some boys did better than girls', 'yes, because there are more higher plots towards the end of the graph' Do not accept 'no because 3 out of 5 boys scored a better mark than the girls', 'yes, the boys had higher plots', 'the boys had the highest mark', 'no, as boys marks are close to the girls marks', 'yes, boys had higher marks', 'yes because boys do better in English', 'yes because the highest mark for girls is 70 and boys is 75', 'yes because boys had over 70 marks and girls highest mark was 70', 'no, both diagrams are similar', 'no, both have positive correlation', 'yes, boys have a greater range'
5(b)(ii) States or implies 'get more results', 'collect more data', 'repeat the test'	E1	Do not accept 'put the results on one graph', 'compare the mean scores'
5(c) Straight line of best fit for boys, appropriate for trends, with points above and below the lines Approximately 55 marks	B1 B1	Do not accept a line of best fit through (0, 0) Accept an answer in the range 53 to 57 marks inclusive FT for 'their line of best fit' including a 'curve' (not dot to dot)

GCSE Mathematics – Numeracy Unit 1: Intermediate Tier Autumn 2016	Mark	Comment
6. (Money in bank account) 100 × 4 + 820 (Money spent) 4 × £250 + 400 × 50p or 400 × (£)3 or equivalent (Bank balance) (£)20	 M1 M2 A1	*Calculations may be embedded in stages of working* (= £1220) (=£1200) Place value must be consistent or correct units stated (may be implied in later working), i.e. could lead to £1200 M1 for sight of 4 × (£)250 and 400 × 50(p) or equivalent OR M1 for either … × (£)250 + 400 × 50(p) or 4 × (£)250 + … × 50(p) or equivalent CAO. Do not accept an unsupported answer of (£)20
7. (Time difference) 5 hours 13:00 + 10 hours 30 minutes - 5 hours Thursday 18(:)30 or Thursday 6(:)30 p.m.	B1 M1 A2	 FT 'their 5 hours' Allow 'Thursday 18(:)30 p.m.' A1 for 18(:)30 or 6(:)30 p.m. or 'Thursday 6(:)30' *Award B1 and SC1 for an answer of 'Friday 04:30' or 'Friday (0)4(:)30 a.m.'* *Also FT for SC1 for adding 'their 5 hours', i.e. 23:30 + 'their 5 hours' with 'Friday' (unless 'their 5 hours' < 30 minutes*
8. Unambiguous straight line from midpoint, ± 2mm, AD towards BC Unambiguous angle bisector of DÂB ± 2° Arc centre A with radius 3cm ± 2mm Correct region indicated	 B1 B1 B2 B1	All lines and arcs must be of sufficient length to be able to select the correct region Intention of straight line with or without a ruler B1 for arc centre A of either insufficient length or tolerance > ± 2mm but <± 5mm, or for an arc with correct radius but centred at B Do not accept if arcs are included at C or D FT provided similar region with an attempt at the horizontal line and the sloping straight line from A, and provided at least B1 awarded for the arc

GCSE Mathematics – Numeracy Unit 1: Intermediate Tier Autumn 2016	Mark	Comment
9(a)(i) Reason, e.g. 'because it is not 30% less than the original amount', 'it is 30% less of a different amount', '30% for Lotty is not the same as 30% for Rafael', '30% of his share is more than 30% of her share', 'it would be 30% of Lotty's winnings so it would not be 30% of Rafael's total winnings', 'Lotty's share will increase by 30% not by the percentage of his amount'	E1	Ignore additional spurious comments Allow a correct reason ignoring calculations provided the reason is not based on calculations Allow 'they do not get the same amount of money to begin with', 'because Rafael has 3 of the ratio when Lotty has the total of 2', 'because Rafael gets a higher ratio than Lotty' Do not accept 'this is because the shares wouldn't be even', 'because Rafael will get more than Lotty', 'he would get 30% less'
9(a)(ii) 2000 × 2 ÷ 5 or equivalent × 1.3(0) or equivalent (£) 1040	 M1 M1 A2	 A1 for intermediate answers of (£) 800 or (£)2600
9(a)(iii) (Rafael now wins 2000 – 1040) (£) 960 New ratio fully simplified 13 : 12	B1 B2	FT 2000 - 'their 1040' provided both previous M marks awarded This mark may be implied in further working B1 for new ratio (1040 : 960) with at least one step of simplification, e.g. 104 : 96, 520 : 480 FT provided equivalent difficulty, award B1 only if only 1 common factor in the simplification, or B1 for 12 : 13 given in the answer space
9(b) 0.94 × 3000	B1	Allow 3000 × 94/100 Do not accept 3000 – 0.06 × 3000

GCSE Mathematics – Numeracy Unit 1: Intermediate Tier Autumn 2016	Mark	Comment
10(a) 605 cm	B1	
10(b) 249.5 cm	B1	
10(c) Consistent use of units for comparison, e.g. desk 200cm if another measure is given in cm	B1	<u>Penalise -1 only the use of the 'their desk' ≠ 200</u> Accept comparison with one other length, e.g. sight of 2000mm = 200cm is sufficient if any other working seen in cm (irrespective of use of bounds)
Use of 147.5 (cm) or 250.5 (cm) or 595(cm)	B2	'Use of' can be any of these values used within a length calculation (including the bookcase, the wardrobe and either the wall or the desk), or 595(cm) used in the interpretation within a conclusion Allow 147.49•(cm) or 250.49•(cm) respectively throughout (Otherwise award:) B1 for sight of 147.5 (cm), 250.5 (cm) or 595(cm)
Correctly evaluated calculation which could be interpreted to show the desk (200cm) would not fit, i.e. a counter example showing the desk can not fit	B1	Interpretation is not required for this B1, it is a calculation (showing that the wall or the gap is of insufficient length, i.e.) with an answer >595(cm) or <200(cm) as appropriate <u>Examples</u> (In cm, but working in m or mm is also accepted) *Giving an answer >595:* 147.5 + 250.5 + 200 = 598, or 147 + 250 + 200 = 597, or 146.5 + 249.5 + 200 = 596 OR *Giving an answer <200:* 595 – 250.5 – 147.5 = 197, or 595 – 250 – 147 = 198, or 595 – 249.5 – 146.5 = 199 i.e. working with lengths in the inclusive ranges 146.5 to 147.5 and 249.5 to 250.5 is accepted, condoning mix of upper and lower bounds provided the calculation leads to >595 or <200 appropriately
Conclusion from a correct interpretation of a correctly evaluated calculation, e.g. 'no, not certain as greater than the least length of the wall which is 595(cm)', 'no, 197(cm) is less than the length of the desk which is 200(cm)', 'no, 598(cm) > 595(cm)'	E1	This E1 depends on the award of the previous B1 Sight of 200(cm) or 595(cm) as appropriate for the comparison is required, i.e. 'no, not certain as greater than the least length of the wall' or 'no, 197 cm is less than the length of the desk' would only be awarded E1 if 595(cm) or 200(cm) respectively, has been seen previously

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11(a)(i) 52 hours	B1	
11(a)(ii) 10 girls	B1	
11(a)(iii) FALSE TRUE TRUE FALSE	B2	B1 for any 3 correct answers If no marks, award SC1 for an answer TRUE, TRUE, TRUE, TRUE (as it is a repeat misunderstanding/error)
11(b) Statement 1: Complete method to calculate the interquartile range Girls' IQR (59 or 58 - 33 or 32 =) 25 to 27 AND Boys' IQR (46 or 45 – 19 or 18 =) 26 to 28 AND Trefor correct if IQR boys > IQR girls or Trefor incorrect if IQR boys ≤ IQR girls Statement 2: Conclusion, e.g. 'Incorrect, as the median for the boys is 40 hours which is lower than girls median (52 hours)'	M1 A2 E1	Based on sight of method for either boys or girls, or either IQR correct provided not clearly from incorrect working A1 for either IQR correct Ignore incorrect time notation, e.g. '26.30 hours' for 26.5 hours Conclusion must include statement that 'boys' median is 40 hours' FT for a reason based on 'their 52 hours', (a)(i) and 40 hours. Accept responses based on comparisons of the modal groups 50 to 60 hours (with 52) girls and 40 to 50 hours (with 60) boys Accept comparisons of the estimated means, boys 33.8(571… hours) and girls 45.2(857…hours)

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<tr><td>12(a) Axes labelled appropriately, e.g. (total) cost and (number of) people, AND
uniform number of people scale from 20 (or less) to at least 80

Reasonable uniform total cost scale from 500 (or less) to at least 1700

Correct representation of the total cost for between 20 and 80 people</td><td>B1

B1

B2</td><td>Allow people and costs on either axis
Allow ‘£’ for costs

<table>
<tr><td>People</td><td>20</td><td>40</td><td>60</td><td>80</td></tr>
<tr><td>Cost £</td><td>500</td><td>900</td><td>1300</td><td>1700</td></tr>
</table>
FT 'their scale' if possible
Ignore showing for less than 20 people (and up to 100 people)
May be indicated by an appropriate straight line from 20 to 80 people (£500 to £1700)
B1 for any 2 correct points given (indicated in working or plotted) OR
B1 for all points (indicated in working or plotted), within the range 20 to 80 people inclusive, with a gradient of 20</td></tr>
<tr><td>12(b) $P = 20 + \frac{100}{N}$ or equivalent</td><td>B3</td><td>Mark final answer
B2 for 20 + 100/N or P = … + 100/N
B1 for sight of 100/N</td></tr>
<tr><td>12(c) (2240 – 200) ÷ 20
102 (people)</td><td>M1
A1</td><td>Full method may be shown in stages</td></tr>
<tr><td>13(a)
<table>
<tr><td></td><td>Range</td><td>Median</td><td>IQR</td></tr>
<tr><td>Trefwen</td><td>50 (mm)</td><td>30 (mm)</td><td>25 (mm)</td></tr>
<tr><td>Nawrby</td><td>49 (mm)</td><td>28 (mm)</td><td>30 (mm)</td></tr>
</table></td><td>B4</td><td>B3 for any 5 correct entries, OR
B2 for any 3 or 4 correct entries, OR
B1 for any 1 or 2 correct entries</td></tr>
<tr><td>13(b) Reason, e.g. based on comparisons of median (with the median rainfall for Nawrby being (slightly) lower), OR
little rain as lower whisker 1mm compared with Trefwen at 5mm, OR
Reason based on comparison of lower quartile</td><td>E1</td><td>Values are required within a reason statement, however accept if reference is to values in (a) without restatement, e.g ‘the median for Nawrby is less than the median for Trefwen’
Accept ‘because on average there is less mm of rainfall in Nawrby than Trefwen’ (as the median is the only average in (a))
FT provided ‘their median for Nawrby’ < ‘their median for Trefwen’ provided one of the medians is correct
Ignore other averages and the range, provided the median is mentioned, unless mention of comparisons of lower quartiles</td></tr>
</table>