



GCSE MARKING SCHEME

SUMMER 2017

**GCSE (NEW)
MATHEMATICS NUMERACY - UNIT 1 (INTERMEDIATE)
3310U30-1**

INTRODUCTION

This marking scheme was used by WJEC for the 2017 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 Summer 2017	Mark	Comment
1. 3 6 7 9 10 10 11(cars) 3 + 6 + 7 + 9 + 10 + 10 + 11 and $\div 7$ 8 (cars)	B2 M1 A1	Need not be in this order B1 for sight of $(11 - 8 =) 3$ (cars) and at least two 10s FT intention to sum 'their 7 numbers' and divide by 7, must be 7 numbers CAO, i.e. FT is only for the method mark If no marks, award SC1 for an unsupported answer of '8'
2(a) 15:30	B1	
2(b) 16 km	B1	
2(c) Indicates or implies 'can't tell', with a reason suggesting, e.g. 'don't know in which direction they travel', 'could be (up to) 14 km apart', 'the graph only says distance from home'	E1	Ignore spurious additional information. Allow 'can't tell' with e.g. 'one sister takes a different route', 'different roads taken', 'one sister changed direction', 'could be 9km apart', 'Eleri may have taken a longer route' Do not accept 'can't tell' with e.g. 'they don't leave from the same place', 'Yvon travels slower than Eleri', 'schools finish at different times', 'the graph shows distance from home not distance from school', 'not known if Yvon travels in a straight line'

3. (Tent ground area) 2.5×4.4 $= 11 \text{ (m}^2\text{)}$ (Total cost for 12 nights, pay for 10 nights $\Rightarrow 10 \times 14 + 2 \times 10 \times 4$ $(140 + 80 = \text{£}) 220$ (Saving $= 2 \times 8 \times 15$ $(\text{£}) 240$	M1 A1 M2 A1 M1 A1	Allow for sight of $2(.5)(0) \times 4(.4)(0)$ Working of the ground area must be seen, i.e. sight of 2.5×4.4 not 2×4 or 3×4 CAO, not FT If no area calculation seen award M0, A0 then FT for M and A marks, final mark E0 FT 'their ground area $>12\text{m}^2$ to calculation $10 \times 16 + 2 \times 10 \times 4 (= \text{£}240)$ for M2 or equivalent M1 (see formula below) If incorrect interpretation of 'their ground area', award M1 only for either area $\leq 12\text{m}^2$ with $10 \times 16 + 2 \times 10 \times 4 (= \text{£}240)$, or area $>12\text{m}^2$ with $10 \times 14 + 2 \times 10 \times 4 (= \text{£}220)$, M1 for a sum of two products: $(2 \times) a \times b + (2 \times) 4 \times c$ where $a = 10, 11 \text{ or } 12$ $b = 14 \text{ or } 16$ $c = 10, 11 \text{ or } 12$ The initial $(2 \times)$ is if the error is 2 tents! For example: $12 \times 14 + 2 \times 10 \times 4 (= \text{£}248)$ $10 \times 14 + 10 \times 4 (= \text{£}180)$ $12 \times 16 + 2 \times 12 \times 4 (= \text{£}288)$ Ignore further working attempting to subtract discounts Working with the cost of 1 night, e.g. $14 + 2 \times 4$ or $16 + 2 \times 4$, ignore errors in calculation and award M2 or M1 as appropriate when attempt to multiply by 10, 11 or 12 is seen, i.e work may be seen in stages CAO If previous M0, A0 for costs, award SC1 for sight of 1 night cost $(\text{£})22$ or for sight of 10×14 and $2 \times 10 \times 4$ without indication of addition Allow M1 only 1 person saving CAO, not FT <u>Alternative</u> (How many weeks of saving) $220 \div (2 \times 15)$ M1 (FT 'their 220' for M1 only) $7\frac{1}{3} \text{ or } 7.3(\dots)(\text{weeks})$ A1 CAO If no marks, allow SC1 for $14.6(6\dots \text{weeks})$ or 14.7 from $220 \div 15$ Or equivalent for working with cost per person, i.e. $\frac{1}{2} \times 10 \times 14 + 10 \times 4 = \text{£}110$ and saving $8 \times 15 = \text{£}120$, all previous marks are available
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Conclusion, e.g. 'planned saving is enough to pay for the holiday'	E1	FT comparison for 'their £240 saved' with 'their total cost', provided at least 2 M marks previously awarded one of which must be for area calculation Allow the conclusion 'yes'
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.

4(a)(i) $(10 + 20 + 30) \times 0.6$ or 60×0.6 or $(10 + 20 + 30) \times 60 \div 100$ (£)36	M1 A1	Allow intention of brackets i.e. $10 + 20 + 30 \times 0.6$ CAO and must be from correct working If no marks, award SC1 for an answer of 3600(p), not for £3600
4(a)(ii) $10 \times 20 \times 30$ (= 6000) $\times 0.01$ or $(\times 1) \div 100$ (£)60	M1 m1 A1	An answer of £6000 implies M1 only Depends on previous M1 Award of m1 implies previous M1 CAO If M1 m0 A0 also award SC1 for an answer of 6000p
4(a)(iii) $2 \times \{(10 \times 20) + (20 \times 30) + (10 \times 30)\}$ (= 2200) $\times 0.02$ or $\times 2 \div 100$ (£)44	M2 m1 A1	M1 for sight of sum of at least 2 of the 6 possible products: 10×20, 20×30, 10×30 Depends on M2 or M1 previously awarded CAO If M2 m0 A0, also award SC1 for an answer of 4400(p), not for £4400
4(b) $\frac{60 - 36}{60} (\times 100)$ 40 (%)	M1 A1	Strict FT 'their most expensive' and 'their cheapest' If FT is not a whole number, then accept rounded or truncated to a whole number If no marks, award SC1 for an answer of 60(%) from 36/60 or '<u>their cheapest</u>' 'their most expensive' expressed correctly as a percentage

5(a)(i) (£) $560 \div 7$ (= £ 80) $2 \times 560 \div 7$ OR $6 \times 560 \div 7$ OR $\frac{1}{3} \times (560 - 560 \div 7)$ OR $560 - 560 \div 7$ (Bryn) (£) 160 (Sophie) (£) 480	B1 M1 A1 A1	CAO CAO Alternative: (Total prize money) $560 \times 15 \div 7$ (=£1200) B1 $2 \times 1200 \div 15$ OR $6 \times 1200 \div 15$ M1 FT 'their $560 \times 15 \div 7$' (= 1200) (Bryn) (£) 160 A1 CAO (Sophie) (£) 480 A1 CAO If no marks, award SC1 only for either of the following answers (from initially $560 \div 15$) • (Bryn) (£)74(.66...) or (£)75 • (Sophie) (£)222 or (£)223(.98) or (£) 224
5(a)(ii) $560 - 0.15 \times 560$ or 0.85×560 (=560 - 84) (£)476	M1 A1	Or equivalent full method
5(b) (2015 cost of hosting:) $6600 + 0.1 \times 6600$ (£7260) (2016 cost of hosting:) $7260 + 0.1 \times 7260$ (£7986) AND (2017 cost of hosting:) $7986 + 0.1 \times 7986$ (£8784.60) (2017 cost of hosting is) (£) 8784.6(0)	B1 M1 A1	For the appropriate method of repeatedly increasing by 10% from 2015 to 2017 FT 'their $6600 + 10\%$' calculation <u>with</u> 'their $7260 + 10\%$' calculation <u>with</u> their $7986 + 10\%$ calculation Allow intention with sight of rounding or truncation within working, e.g. (£)799 as 10% of (£)7986 CAO Ignore any further working Alternative Sight of 6600×1.1^3 M1 Full method to calculate 1.1^3 and multiply by 6600 m1 (For method not accuracy, allow arithmetic errors if intention clear.) (£) 8784.6(0) CAO A1 If no marks, award SC1 for an answer of (£)8580 (from simple interest, as first B mark is embedded)

6(a) 230	B1	
6(b) 40	B1	
6(c) Reason, e.g. 'graph for 18-year olds leans towards the greater times', 'the frequency polygon for times from (the plot at) 30 minutes are greater for the 18-year olds', 'more 18-year olds spend longer times than 16 year olds', 'more 18-year olds for 30 minutes, same at 40 minutes and more at 50 minutes', 'more 18-year olds at 50 minutes', 'more 18-year olds from 25 minutes onwards', 'many more 16-year olds than 18-year olds spend 20 (or 25) minutes or less', 'median is higher for the 18-year olds', 'more 16-year olds use less time on social media than 18-year olds'	E1	If readings are used they must be correct, e.g. at 50 minutes there are • 20 16-year olds and 60 18-year olds, • or 40 more 18-year olds than 16-year olds • 3 times as many 18-year olds spend 50 minutes as 16-year olds Allow e.g. 'half way through the 18-year olds frequency rises higher than for 16-year olds' Do not accept irrelevant, incorrect or incomplete statements e.g. 'more 18-year olds spend 30 minutes', 'more 16-year olds spend 20 minutes', 'because more than 60 18-year olds spend 30 to 50 minutes', 'The mode for 16-year olds using social media is the same as for 18-year olds', '16-year olds frequency is higher to start', 'not true because the frequency polygons would look roughly the same', 'not true because the shapes of the frequency polygons are very different', 'there is only one point where 16 and 18-year olds spend the same amount of time', 'because the polygons are not the same', 'the 2 polygons have different trends', 'the average time is greater for 18-year olds'

7. $a = 72^\circ$ and $c = 94^\circ$ $b = 108^\circ$ $d = 86^\circ$ Correct diagram within $\pm 2\text{mm}$ and $\pm 2^\circ$ tolerances	B1 B1 B1 B3	If contradiction between diagram and answer space, mark the answer space, except if a transition slip FT 180 – 'their a' FT 180 – 'their c' Ignore extensions of lines in construction, mark the quadrilateral Attempt (FT) using template irrespective of angles stated B2 for diagram with either of : • $6\text{cm} \pm 2\text{mm}$ and $a = 72^\circ \pm 2^\circ$ and either $b = 108^\circ \pm 2^\circ$ or $d = 86^\circ \pm 2^\circ$ • all correct angles $\pm 2^\circ$ with 6cm incorrect B1 for $6\text{cm} \pm 2\text{mm}$ and $a = 72^\circ \pm 2^\circ$ or $d = 86^\circ \pm 2^\circ$
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8(a)(i) $2 \times 18 \times 1.1(0)$ or $1.1 \times 18 \div 0.5$ or equivalent (=£) 39.6(0)	M1 A1	Award M1 A1 for a correct response from an error in notation such as $18 \times 0.5 = 36$ with $36 \times 1.1 = (£)39.6(0)$ Note: $18 \div 0.5 = 9$, $9 \times 1.1 = (£)9.9(0)$ is M1 A0 as full method shown in stages, but only if the full method is seen, not for an answer of (£)9.9(0)
8(a)(ii) (Length) 6 (m) AND (width) 3 (m)	B2	Accept in either order in the answer space B1 for any 1 of the following: • sight of $18 \div 3$ • sight of $18 \div 6$ • either length or width correct (any order) • answers 12 (m) and 6 (m) (any order) • $1x + 2x + 1x + 2x = 18$ or similar
8(b) $x + 3 + x + 3 + x + x = 16$ or $x + 3 + x = 8$ or equivalent $4x + 6 = 16$ or $4x = 16 - 6$ or $4x = 10$ or $2x + 3 = 8$ or equivalent (Length) 5.5 (m) and (width, x) 2.5 (m)	M1 m1 A1	Accept any variable for 'x' Depends on the previous M1 This m1 implies the previous M1 CAO Needs to be in the correct order in the answer space, or clearly labelled <i>Alternative method to work with y – 3 and y leading to y = 5.5</i> If no marks, allow SC1 for answers of 5.5(m) and 2.5(m) if no equation given or if 'their equation' not used to elicit these answers, OR SC1 for answers of 9.5(m) and 6.5(m) from sight of $x + x + 3 = 16$

9(a)(i) (Needs a further) 11 (squares)	B2	B1 for sight of $6+5+4+3+2+1$ or 21squares
9(a)(ii) States or implies 'correct' with sight of, e.g. • $10+9+8+7+6+5+4+3+2+1$, or • ... 21, 28, 36, 45, 55, or • ... +7, +8, +9, +10 • $5 \times (10 + 1)$	B1	CAO Do not accept any contradictions, e.g. an incorrect answer for the correct sum, i.e. $10+9+8+7+6+5+4+3+2+1$ with an answer other than 55 Allow 'correct' with D10 diagram drawn in the answer space
9(b)(i) 8	B1	
9(b)(ii) States or implies 'No' with a reason, e.g. 'all Josef's patterns have an odd number of squares', 'same number on each branch from the one top square makes it an odd number', 'one square left over', 'one square short', 'one more needed', 'the arms would be unequal (in length)', '22 is even', 'P10 is (made using) 21 (squares), P11 is (made using) 23 (squares)', 'he would only be able to make a pattern with 21 squares'	E1	Do not accept 'No' with, e.g. 'too many squares', '22 is not part of the pattern', 'it is unequal'
9(b)(iii) P4	B2	Allow $P = 4$ B1 for sight of $10 \div 0.5$ or 20 (small square edges) or shows 5 squares on each side (stated or diagram in the answer space for (b)(iii)) B0 for P20 unless sight of $10 \div 0.5$ (which is awarded B1)

10(a) 45 (seconds)	B1	
10(b) 30	B1	
10(c) $0.9(0) \times 70$ = 63 (passengers) (In 60 seconds) 65 (passengers left) OR 63 passengers within (58 or) 59 seconds OR 63 (passengers) in less than 60 seconds Conclusion that the target was met	M1 A1 B1 E1	Ignore incorrect units Check the diagram for indication, provided values are written FT 'their 63' provided M1 previously awarded Depends on M1, B1 previously awarded <i>Alternative:</i> <i>By 1 minute, 65 passengers left</i> B1 <i>(100 ×) 65/70</i> M1 <i>0.92(8...) or 0.93 or 92(.8%) or 93(%)</i> A1 <i>Conclusion that target met</i> E1 <i>(Depends on M1, B1)</i> <i>Alternative:</i> <i>For candidates clearly considering the number of passengers left on the plane, must be evidence of this before awarding marks</i> <i>(0.1 × 70 =)</i> <i>7 (passengers left on the plane)</i> B1 <i>(After 1 minute) 70 – 65</i> M1 <i>5 (passengers)</i> A1 <i>Conclusion that target met</i> E1 <i>(Depends on M1, B1)</i>
11(a) April	B1	
11(b) January	B1	
11(c)(i) January and February	B1	In either order
11(c)(ii) 43	B1	
11(d) FALSE TRUE FALSE FALSE	B2	B1 for any 3 correct responses

12(a) 8×10^{-5}	B1	
12(b)(i) 30 (pieces of card)	B2	If working is shown, it needs to be correct for the award of B2 Do not accept final answer of 30mm for B2 B1 for: 3×10^{-2} written as 0.03 (metres) or 3 cm or (0.03m $\Rightarrow$) 30mm OR for a calculation that could lead to a correct response, e.g. $3 \times 10^{-2} \div 0.001$ or $(3 \times 10^{-2}) \div (1 \times 10^{-3})$ or $3 \times 10^{-2} \times 1000$ (Watch for compensating errors such as $3 \times 10^{-2} = 0.003$, $0.003 \times 1000 = 30$, this is awarded B1 for intention of $3 \times 10^{-2} \times 1000$)
12(b)(ii) Assumption, e.g. ‘no gaps between pieces of card’, ‘all pieces of card completely touch’, ‘all pieces of card are (exactly) 1 mm thick’	E1	Allow e.g. ‘the thickness of each piece of card is the same’, ‘none of them are folded’
12(c) Use of 1 tonne = 1000 kg $1000 \times 2.88 \times 10^7 \div (7.2 \times 10^9)$ or $1000 \times 28\,800\,000 \div 7\,200\,000\,000$ or equivalent	B1 M2	For M2 any calculations used by the candidate (which may be seen in stages) need to be correct, unless replaced with a correct calculation, perhaps e.g. reverting back to correct standard form FT ‘their 1000’, provided a power of 10 and $\neq 1$ M1 for $(2.88 \times 10^7 \text{ (tonnes)}) \div (7.2 \times 10^9)$, or $28\,800\,000 \div 7\,200\,000\,000$, including no attempt to change tonnes to kg or possible place value errors in converting from standard form, this could be implied within working
4 (kg per person)	A1	CAO