GCSE MARKING SCHEME

AUTUMN 2017

**GCSE
MATHEMATICS – NUMERACY
UNIT 1 - INTERMEDIATE TIER
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 Autumn 2017 FINAL	Mark	Comment
1(a) £5 500 000	B1	
1(b) 15 × 8 ÷ 5 or 15 × 1.6(09) or 15 × 1.61 or equivalent	M1	Accept sight of 15 + 0.6 × 15 (= 15 + 9)
24(.135 …km)	A1	Ignore decimal digits, e.g. use of 15 × 1.61 = 24(.15 km) N.B. Use of 3 miles ≈ 5 km giving 15 miles ≈ <u>25 (km)</u> is M1, A0 Unsupported 25 (km) is M0, A0
1(c) 148 × 30 (÷ 100) or equivalent	M1	Multiplication involving digits 148 and 3, division by 100 is not required Ignore place value errors in the calculation

44.4 (m)	A2	Any units given in a final answer must be correct for A2
		A1 for sight of 4440 (ignoring units) , or 44m 40cm
		A1 for '0
		       4
		        440' (from Napier's rods)
		
		Alternative
		148 × 0.3(0) M2
		44.4 (m) A1
		(A0 if incorrect units are given)

2(a) 	Supermarket / Cost of 6 lemons table	B4	*Penalise incorrect units -1 once only* B1 for each supermarket

Supermarket	Cost of 6 lemons
Cost 4go	(Can buy exactly 6 lemons Twice 3 for 2, 2×2×40p) **(£)1.6(0) or 160(p)**
Edges Mart	(Has to buy 8 lemons 2 nets of 4 lemons) **(£)1.5(0) or 150(p)**
Food Uno	(Has to buy 10 lemons 2 bags of 5 lemons) **(£)1.52 or 152(p)**
Greenway	(Can buy exactly 6 lemons 6 × 26p) **(£)1.56 or 156(p)**

Conclusion to buy at Edges Mart	E1	Accept '**(£)1.5(0) or 150(p)**' as indication of Edges Mart Depends on at least B2 previously awarded, then FT 'their cheapest cost' provided it is based on at least 3 costs calculated
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
Accuracy of 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.
2(b) Food Uno with a reason, e.g. 'only an extra 2p for 2 more lemons', 'lemons only 15(.2)p each', '10 lemons for (£)1.52', 'he can get 10 lemons for a cheaper price than in other supermarkets', 'you get more lemons for less price', 'Food Uno, they give a bag of 5 for 1p more than Edges Mart with 4 lemons'	E1	FT from (a) provided at least B2 previously awarded in (a) with at least one of these B marks for either Edges Mart or Food Uno Allow, e.g. 'it has the cheapest lemons for the number you get and you have more left over'

3(a) 35	B1		
3(b) Need 8 metres of panels	S1	Stated or implied	
Panels, any indication of 1 the following: • 4 × 2 (m) • 2.5(m), 2(m), 2(m), 1.5(m) • 2.5(m), 2.5(m), 2(m), 1(m) • 2.5(m), 2.5(m), 1.5(m), 1.5(m)	B2	*Posts and panels do not have to be shown in any particular order (also see diagram)* FT from 8.5 – 'their width for post(s)', provided 4 possible whole panels are selected B1 for any 1 of the following: • if total length of their 4 panels adds to 8.5 m (posts forgotten) • if total length of their number of panels, ≠4, adds to 8 m • using 4 panels (not adding to 8m) • FT 8.5 – 'their width for post(s)' provided 2 or 3 whole panels are selected *Do not accept any panels cut into fractions*	
Cost for the fence as appropriate: • 5 × 14 + 4 × 30 • 5 × 14 + 40 + 2 × 30 + 26 • 5 × 14 + 2 × 40 + 30 + 18 • 5 × 14 + 2 × 40 + 2 × 26	M2	Ignore any incorrect units for M2 or M1 FT provided B1 or S1 previously awarded for M2 or M1 (but A0) M1 for 1 of the following: • calculation costing 'their panels' only (posts not included), • cost of posts (5 × 14 =) (£) 70, which may be elicited from within a calculation	
(£) 190 OR (£) 196 OR (£) 198 OR (£) 202	A1	CAO Only these answers accepted and **must be from** correct working. Do not ignore incorrect units, if a unit is given it must be correct	
3(c) 1(.)50 × 0(.)10 × 4 × (0.0)2	M2	Allow inconsistent units for M marks Ignore any extra faces painted M1 for 1(.)50 × 0(.)10 with either × 4 or × (0.0)2	
120(p) OR (£)1.2(0)	A1	CAO, if units are given they must be correct for A1 *Do not ignore further working, such as painting top and/or bottom of the post (for A mark)*	

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4.			FT throughout
$a = 113°$		B1	
$b = 108°$		B1	FT 360 – 67 – 72 – 'their a', or 221 – 'their a' *(Check if a + b = 221)*
$c = 51°$		B1	FT 180 – 21 – 'their b', or 159 – 'their b' *(Check if b + c = 159)*
$d = 51°$		B1	FT for 'their d' = 'their c' provided c ≠ 90° and c ≠ 180° or any other multiple of 90°
5(a) All 6 plots correct	B2	B1 for - any 3, 4 or 5 correct plots not joined point to point, or - all 6 correct plots but joined point to point Ignore sight of any attempt at a line of best fit
5(b) YES and a reason, e.g. 'positive correlation', 'increase in height with increase in waist', 'the height and waist are increasing'	E1	Do not accept reference using values from the table, without further explanation
5(c) Reason, e.g. 'the measurements for these 6 people show correlation, but people don't come in standard sizes', 'it is only 6 people', 'not all people follow the trend', 'waist and height measurements are not directly proportional', 'not enough data', 'you really need more data to tell', 'because she could have chosen the people on purpose to prove her point', 'because some people are thinner than others but the same height', 'some waists might be the same as others'	E1	<u>Ignore additional comments referring to improvement</u> Allow, e.g. 'Ffion has not considered children', 'because waist sizes often vary', 'because not everybody is the same', 'they are not always in a straight line' Do not accept, e.g. 'could be measured incorrectly', 'could repeat the experiment', 'measure more people', 'get more data' (implies how to improve, not a comment on the data given) *Do not accept reasons based on how to improve the experiment alone*

6(a) 5 × 13 + 26 + 9 × 7 + 38 (91 + 101)	M1	Attempt to add must be implied, not for sight of 5 × 13 + 26 and 9 × 7 + 38
(£)192	A1	CAO If units are given they must be correct
(Change) (£) 8	B1	FT 200 - 'their £192' provided ≤ £200 and either • (£)91 or (£)101 seen in a sum of two amounts, or • M1 previously awarded *Do not accept either* *5 × 13 + 26 + 9 × 5 + 38 (= £174) or* *7 × 13 + 26 + 9 × 7 + 38 (= £218) as misreads, however award of B1 may be possible*
6(b) Equating 13x + 26 with 9x + 38 or sight of a correct evaluated trial of the same number of days for cement mixer and jet washer	B1	Formal notation is not required Sight of 13x + 26 with 9x + 38 is insufficient without further correct working
13x – 9x = 38 – 26 or 4x = 12 or x = 12/4 or trial & <u>improvement</u> (i.e. testing for a number of days with a 2nd trial getting closer to 3 days unless original trial is 3 days)	M1	FT equivalent level of difficulty Method to solve may be informal
3 (days)	A1	CAO. Some relevant working must be seen to award all 3 marks Do not award all 3 marks for an <u>unsupported</u> correct response, however award SC2 Sight of both costing (£)65 is B1, M1, but A0 if 3 days not seen in working A final answer of 65 (days) is B1, M1, A0

Number of days	Cement mixer £	Jet washer £
1	39	47
2	52	56
3	65	65
4	78	74
5	91	83
6	104	92
7	117	101
8	130	110

7. A line from Ty Gwyn of 9cm ± 2mm or an unambiguous point within tolerance (indication of 9cm ± 2mm)	B1	
Showing arcs for bisection of the angle Correct bisection of the angle ± 2°, with the line shown	M1 A1	May be outside tolerance

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8(a)(i) (Ysgol) Caewen and (Year Group) 10	B1		

8(a)(ii)   FALSE
       TRUE
            FALSE
       TRUE
       TRUE
	B3	All 5 correct
		
		B2 for any 4 correct
		B1 for any 3 correct

8(b)(i) 1480 (miles)	B2	B1 for sight of any one of • 200 ÷ 5 • 40 (miles) in 1 year • 80 (miles in 2 years) B0 for an answer for 2018 as 1600 (miles) *Ignore statement of incorrect unit, such as km for miles*
8(b)(ii) Reason suggesting rate of increase not necessarily linear, e.g. 'unlikely to be a constant rate of increase', 'not a uniform pattern each year', 'they can vary', 'because there can be more one year than another year', 'it is a total over 5 years so the number each year can increase or decrease', 'not the same miles every time', 'there could be more routes in different years', 'don't know what will happen', 'because this is just an estimate based on previous data', 'cycling becoming more popular, rate may increase because of it', 'could have run out of money'	E1	Do not allow if additional incorrect statements are made Allow, e.g. 'because it can change', 'perhaps they have not built any more since 2016', 'cycling becoming more popular', 'January 2018 hasn't happened yet' Do not accept, e.g. 'because it is an estimate'

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9(a) Reason, e.g. 'fixed costs', 'still has some costs to pay', 'because it costs to run the place', 'because it costs to run without dogs', 'still has to pay electricity', 'there is a starting cost', '(s)he still has to pay bills'	E1	Do not accept, e.g. 'the costs start at £10'
9(b) Suitable calculation to find the gradient, e.g. • $\frac{250 - 50}{60 - 10}$, • (between 30 and 20 dogs is £130 - £90 so 10 dogs £40, so per dog) $\frac{130 - 90}{10}$	M1	
(£) 4	A1	CAO, accept unsupported (£)4 (for M1, A1) If units are given they must be correct
9(c)(i) Line drawn parallel to the line given through 20(dogs) (£)130	B2	Mark intention of a parallel line B1 for 1 of the following: • a straight line with a positive gradient through 20(dogs) (£)130, • line drawn parallel to the line given
9(c)(ii) A reading from the graph provided it is between £168 to £172 inclusive, or (a calculation leading to) £170	B1	FT 'their straight line graph' (positive gradient) with the same tolerance ±£2

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10(a)(i) Median in the inclusive range 16.8 to 17 (minutes)	B1	
Interquartile range 19 to 19.3 - 14 to 14.3 Answer in the range 4.7 to 5.3 (minutes)	M1 A1	
10(a)(ii) Reason, e.g. 'the points on the diagram have been joined with straight lines', 'the data has been grouped, so actual times have been lost', 'the raw data is more detailed (than graph)', 'not exact using a cumulative frequency diagram', 'it is just an estimate using the diagram'	E1	Allow, e.g. 'the raw data is more detailed than Meirion's data' (although both Meiron's data!), 'the points could be joined by a curve' Do not accept, e.g. 'seconds can not be presented'
10(b) 34 – 12 22 (of his customers)	M1 A1	
10(c) Sight of either of the following: • (80% of 120 =) 96 (customers) **OR** (20 minutes is) 102 (customers) • (20% not cleaned in 20 minutes is) 24 (customers) **OR** 18 (customers more than 20 minutes) Sight of any of the following: • (80% of 120 =) 96 (customers) **AND** (20 minutes is) 102 (customers) • (20% not cleaned in 20 minutes is) 24 (customers) **AND** 18 (customers more than 20 minutes) • (96 customers is)19.3 to 19.8 (minutes) • (102 customers is 102/120 × 100 =) 85% • (102 customers is 102/120 × 100 =) 85% • (18 customers is 18/120 × 100 =) 15% Conclusion 'yes'	M1 M1 A1	Accept readings on the graph Accept readings on the graph CAO from correct working only and M2 awarded Accept 'no as 85% (**not** 80%) in less than 20 minutes'

11(a) 21p	B1	
11(b)		<u>Throughout: if units are given they must be correct, or a consistent FT from 5 charges in (a)</u>
Number of units of electricity (14400 – 13900 =) 500 (units)	B1	

(Charge for electricity) 500 × 21(p)	M1	FT 'their 14400 – 13900',
		or 14400 – 13450 (= 950)
		Allow M1 (but A0) for any of, e.g.
		  • (14400 × 21p =) (£)3024
		  • (13900 × 21p =) (£)2919
		  • (13450 × 21p =) (£)2824.5(0)
		  • (450 × 21p =) (£)94.5(0)
		or equivalent answers in pence
		(These do not involve a subtraction of units)

(£)105	A1	Accept 10500p or £105.00p
		FT provided subtraction of units has been attempted
		calculation examples:
		  • *21p × 950 =(£)199.5(0)*
		  • *20.5p × 500 = (£)102.5(0)*
		  • *21.5p × 500 = (£)107.5(0)*
		  • *22p × 500 = (£)110*
		  • *22.5p × 500 = (£)112.5(0)*

Standing charge for August, September and October (£)23.4(0)	B1	CAO

Total charges (105 + 23.40 =) (£)128.4(0)	B1	FT 'their charge for electricity'
		          +
		  'their standing charge',
		provided these amounts are from:
		  • M1 previously awarded, **and**
		  • 'their standing charge > £22.80 but ≤£24
		
		FT 500 units examples:
		(20.5p) £23.40 + 102.50 = £125.90
		(21.5p) £23.40 + 107.50 = £130.90
		(22p) £23.40 + 110.00 = £133.40
		(22.5p) £23.40 + 112.50 = £135.90

5% VAT (£)6.42	B1	FT provided at least M1 and B1 previously awarded *(Possible VAT FT 500 units with <u>consistent</u> use of:* *20.5p leads to £6.29, £6.295, £6.30* *21.5p leads to £6.54, £6.55, £6.545* *22p leads to £6.67* *22.5p leads to £6.79, £6.795, or £6.80*
Total bill (£)134.82	B1	CAO

See next page.

Budget calculation involving at least 2 of the key amounts, i.e. (£)470 – (£)134.82 – (£)330, or (£)470 – (£)134.82, or (£)470 – (£)330, or (£)134.82 + (£)330	M1	FT 'their £134.82' provided at least 3 marks previously awarded
Conclusion from a correctly evaluated calculation, e.g. 'yes' 'able to afford as £335.18 left after paying for electricity', 'afford as would be left with £140 after buying the washing machine to pay the electricity bill', 'she can buy it and have £5.18 left', 'it only costs £464.82, £470 in the bank'	A1	FT from M1 for an appropriate conclusion with a correctly evaluated calculation
12(a)(i) Orange pippin and 57 (mm)	B1	Accept 'orange' or 'pippin' as indication of the correct tree
12(a)(ii) 41 (mm)	B1	
12(a)(iii) Pink Lady and 33 (mm)	B2	B1 for any of the following: - Gala with 30 (mm) - Orange pippin 29 (mm) - Pink Lady with 79 – 46 - No apple indicated but IQR answer 33 (mm)
12(b) Gala selected with a reason e.g. '(highest) upper quartile', '25% over 80 mm' **OR** Pink Lady selected with a reason e.g. '(highest) median', 'half are over 63 mm'	 B1	Ignore units throughout Do not accept reasons based on range or IQR Do not ignore additional any statements of range, IQR, lower quartile Ignore an incorrect median stated for Pink Lady, e.g. 66mm, provided it is >61 and <67(mm)
13. $4 \times 15 \div 6$ or 4×2.5 or $4 + 4 + 2$ or equivalent 10 (cm)	M1 A1	Allow M1 for $\frac{height}{15} = \frac{4}{6}$ or $\frac{height}{4} = \frac{15}{6}$ CAO