GCSE MARKING SCHEME

SUMMER 2019

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

INTRODUCTION

This marking scheme was used by WJEC for the 2019 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)

SUMMER 2019 MARK SCHEME

GCSE Mathematics-Numeracy Unit 1: Intermediate Tier	**Mark**	**Comments**
1.		Penalise -1 only on their first possible A1 for incorrect units. Ignore units not given
(¼ kg strawberries costs) (£) 2.15	B1	
(Mr Thomas pays) 20 – 2.55 OR (Cost of strawberries from £20) 20 – 8.60 ÷ 4	M1	(=£17.45) (= 20 – 2.15 = £17.85)
(Cost of 1½ kg raspberries) 20 – 2.55 – 8.60 ÷ 4 (= £) 15.3(0)	m1 A1	(=£17.45 - £2.15 or £17.85 – 2.55) Sight of (£)15.3(0) implies all previous marks FT 'their 8.60 ÷ 4'
(Cost of 1 kg raspberries) 15.3(0) ÷ 3 × 2 or 15.3(0) ÷ 1.5	M1	FT 'their 15.3(0)'
(= £) 10.2(0)	A1	
		Consider implication of units not given in W mark
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.

2(a)(i) $\frac{3}{8}$	B1	
2(a)(ii) 1 : 1	B1	
2(b) Selects or unambiguously implies 'Shorter than Dieter's sunflower' **AND** • states or uses a suitable conversion, e.g. '90 cm is 36 inches' (as given), or '1 inch is 2.5(4) cm', or equivalent OR • shows a calculation based on an appropriate conversion, e.g. sight of 90/36, or 10÷4, or similar	E1	Equivalents include: • 12 inches as 30 cm • 6 inches as 15 cm • 9 cm as 3.6 inches • 10 cm as 4 inches
Stating or giving any of the following • 80 cm as 30 inches to 32 inches inclusive • 24 inches as 60 cm to 62 cm inclusive	B1	B1 implies previous E1 provided 'Shorter than Dieter's sunflower' selected

3(a)(i) (Aled's mum paid) (£) 220 OR (Aled and Gareth pay a total of 660 – 220) (£)440	B1	
(660 – 220) ÷ (1 + 9) or 9 × (660 – 220) ÷ (1 + 9) or 44 or 9 × 44	M1	FT 660 – 'their derived 220'
(Aled paid) (£) 44 (Gareth paid) (£) 396	A1 A1	FT 9 × 'their 44' FT 440 – 'their 44' provided M1 awarded (this allows If answers 44 and 396 are reversed, M1, A0, A1 to be awarded) If M0, A0, A0 award SC1 for any of the following • answers that add to 'their 440' • answers (£)66 and (£)594 • answers (£)22 and (£)198
3(a)(ii) Explanation, e.g. 220 + 44 + 396 (= 660), 'add them all up', 'check to see if the total is (£)660', 'divide Gareth's amount by 9'	E1	Depends on at least 1 mark awarded in 3(a)(i) Mark as appropriate to candidate's method in 3(a)(i), e.g. accept alternative method using £44 or £396 (if originally found from subtraction, sight of appropriate multiplication or division, or vice versa) If values are used, FT provided the 3 values total (£)660 If a total is given in a response it must be correct, (£)660 Allow, e.g. 'multiply Aled's mother's amount by 3',
3(b) Sight any of any one of the following: • (21.13kg – 20kg =) 1130 (g) • 21130 (g) • consistent conversion of units g to kg, keeping 21.13kg and 20kg unchanged	B1	Allow 1.13 (kg) provided it is interpreted correctly Accept evidence in working, do not award if working is not seen If units are given they must be correct
Coat AND Jumper (820 + 320)	B2	Do not award B2 unless either previous B1 awarded or appropriate correct working shown Do not award B2 if incorrect working or no working seen B1 for any of the following: • 1130 – 820 = 310 • Coat with sight of 310(g) left • Unambiguous choice of 820(g) AND 320(g) to remove • 'coat and jumper' without working shown, not to be awarded if incorrect working seen Note: B1, B2 for unambiguous choice of Coat AND Jumper with for sight of 21130 – 820 – 320 = 19 990 or 820 + 320 = 1140 OR B1, B1 for sight of 21130 – 820 – 320 = 19 990

3(c)(i) Appropriate calculation, e.g. 9 × 11.4(0), 34.2(0) + 68.4(0), 3 × 34.2(0), 45.6(0) + 57(.00), (45.6 + 5.7) × 2 102.6(0) (euros)	M1 A1	Calculation that could lead to the correct answer if evaluated correctly
3(c)(ii) Appropriate calculation, e.g. 11.4(0) ÷ 2 + 22.8(0), 57(.00) ÷ 2, (34.20 + 22.80) ÷ 2 28.5(0) (euros)	M1 A1	Calculation that could lead to the correct answer if evaluated correctly
3(d)(i) Correctly completed frequency diagram	B1	Bars of correct height (16 and 33) for the missing intervals
3(d)(ii) $1.12 \leq b < 1.16$	B1	
4(a) 24 (miles per gallon)	B1	
4(b) 2.2 (litres)	B1	
4(c)(i) Sight of 55, 57, 53, 17, 48 (55+57+53+17+48) ÷ 5 (230 ÷ 5 =) 46 (miles per gallon)	B1 M1 A1	 FT 'method to sum 5 numbers' provided at least 3 are correct FT provided at least 4 correct values are used FT responses must be evaluated not left as improper fractions, however allow rounded or truncated final answers
4(c)(ii) Explanation of why it is not a suitable average, e.g. 'included the rogue value', 'gives a lower value', '17 appears to be an anomaly', 'one car goes far less than the others', 'because there is one really low value', 'mean is unduly affected by use of 17'	E1	Allow, e.g. 'only considered 5 cars', 'not enough cars', 'because there are fewer cars', 'insufficient data', 'not considered all the cars with engines less than 1.5 litres', 'not considered all 6 (or 7) cars'
4(d) Straight line of best fit, following the trend with some points above and some below the line	B1	Allow slight adjustment down, considering the rogue value, the trend must be correct The line of best fit, shown or if extended, must not be connected to any corners of the graph paper Allow intention of a straight line

<table>
<tr>
<td>4(e) Unambiguous decision with a reason, e.g.
‘Yes, as more cars with engines less than 2.5 litres’,
‘Yes, many cars with engine size less than 2.5 litres’
‘Yes, 15 or 16 cars shown <2.5 litres’,
‘Yes, as only 10 cars (out of 26) with ≥2.5 litre engine’,
'Yes, more data',
“Yes, more readings’
'Yes, stronger correlation',
'Yes, (more) points are closer to the line of best fit',
‘Yes, more cars’,
‘Don’t know (or No), as there is one rogue value for a car with engine size <2.5 litres’,
‘No, data not a large set’,</td>
<td>E1</td>
<td>Allow, e.g.
‘Yes, they are closer together’,
‘Yes, plots before 2.5 are close together’
Yes, results are quite similar’
‘Yes, they have a similar range in fuel economy’,
‘Yes, as only 10 cars (out of 26) with >2.5 litre engine’

Do not accept, e.g.
‘Yes, because before there is a lot of fuel economy’,

Do not accept contradiction between the choice of yes, no and don't know and their reason</td>
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<td>5(a) (Area) ½ × 8 × (10 + 12)
or 10 x 8 + ½ × 8 × (12-10)
88 (cm^2)

(Cost) 5 × 1.5(0)

(£)7.5(0)</td>
<td>M1

A1

M1

A1</td>
<td>Strict FT for ‘their derived area’ used with the table of charges
A ‘derived area’ is a value obtained form any calculation which a candidate considers as ‘their area’

FT for ‘their derived area’ used to select the charge
<table>
<tr><th>Area of label, to the nearest cm^2</th><th>Cost to print 500 labels</th></tr>
<tr><td>Up to 80 cm^2</td><td>(£) 5.75</td></tr>
<tr><td>81 cm^2 to 85 cm^2</td><td>(£) 6.25</td></tr>
<tr><td>86 cm^2 to 89 cm^2</td><td>(£) 7.5(0)</td></tr>
<tr><td>90 cm^2 or more</td><td>(£) 8.75</td></tr>
</table>
</td>
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<tr>
<td>5(b)(i) 375 (cm^2)</td>
<td>B1</td>
<td></td>
</tr>
</table>

5(b)(ii) (Value sum dimensions) 40+25+30 (S = 95)	B1	
(Value area largest face) 30 × 40 (F = 1200)	B1	
For sight of any 1 of the following: • (Sum of values S + F =) 1295 • ⅕ × (95 + 1200) × 0(.)02 • ⅕ × 95 × 0(.)02 • ⅕ × 1200 ×0(.)02	B1	Not a FT mark
Any correct substitution into the given formula, e.g. (Cost) 1/5 × (95 + 1200) × 0.02 (= 259 × 0.02) or ⅕ × 95 × 0.02 + ⅕ × 1200 ×0.02 (= 0.38 + 4.8(0))	M1	FT 'their derived S' + 'their derived F' ('derived' meaning not taken from the diagram) Allow intention of brackets, provided not contradicted For a single calculation or may be seen in stages Allow M1 for ⅕ ×1295 × 2 or ⅕ × 95 × 2 + ⅕ × 1200 ×2
(=) (£) 5.18	A1	Examples of possible FT answers: Sum of values / Cost in £ 680 / 2.72 740 / 2.96 755 / 3.02 820 / 3.28 1080 / 4.32 1095 / 4.38 1160 / 4.64 1280 / 5.12 1360 / 5.44

6(a) Correct position indicated	B3	Allow ±2 mm and ±2° throughout Irrespective of any indication of construction correct or otherwise If not indicated, allow for the correct and unambiguous intersection of the perpendicular bisector and the arc If not B3, award: B1 for an arc of radius 4cm in the correct position AND B1 for perpendicular bisector between Block 1 and Block 2 drawn (accept bisector indicated as a short **vertical** indication at the midpoint between Block 1 and Block 2)
6(b) Answer in the range 102 to 110 (metres)	B1	
7(a) (Cost to Sam) 200 × 25 (= £ 5000) (Number of trees Sam expects to sell is) 200 – 0.22 × 200 or 200 × 0.78 (=) 156 (trees) (Money from sales of trees is 40 × 156 = £) 6240 (Expected profit is £6240 - £5000 =) (£) 1240	M1 M1 A1 B1 B1	 Depends only on previous M1 FT the number of trees sold, i.e. 40 × 'their 156' FT 'their (40 × 'their 156')' – 5000 correctly evaluated
7(a) Alternative method: *(Number of trees Sam expects to sell is)* *200 – 0.22 × 200 or 200 × 0.78* *(=) 156 (trees)* *(Expected profit)* *156 × (40 – 25)* *- (200 – 156) × 25* *(£) 1240*	 *M1* *A1* *M2* *A1*	 *FT 'their 156'* *M1 for 156×(40-25) - ..... or* *.... - (200 – 156) × 25)* *CAO*
7(b) A suitable diagram with at least 3 hexagons (or 2 extra hexagons) shown to tessellate OR Sight of 3 × 120° = 360° or equivalent	E1	ISW A suitable diagram will involve 3 hexagons meeting at a point shown at least once, the 6 sides of the hexagons must be shown Allow if a correct diagram given with angles unlabelled or incorrectly labelled Do not accept if only the exterior angles (labelled correctly or incorrectly) of the given hexagon show, need to show further hexagons

8(a)(i) 045(°) ± 2°	B1	Ignore any additional direction included, such as N(orth) E(ast) (or an incorrect direction) B0 for 45° ± 2° and/or N(orth) E(ast)
8(a)(ii) 202(°) ± 2°	B1	
8(b)(i) Sight of (Milford Haven to Ruabon) 90 × 1⅓ OR (Ruabon to Swansea) 80 × 1¼	M1	For the appropriate idea of speed × time. Allow sight of • 90 × 80 (minutes) • 80 × 75 (minutes) • 90 × 1.3(3) • 90 × 1.2(0) • 80 × 1.15
(Milford Haven to Ruabon) 120 (miles) AND (Ruabon to Swansea) 100 (miles)	A2	CAO A1 for 90 + 30 or 80 + 20 or equivalent **only** provided there is no evidence of any misconception, e.g. (80 + 35)
(Total distance) 220 (miles)	B1	FT provided at least M1, A1 previously awarded
8(b)(ii) (Total time is) 155 (minutes), or for sight of 80 (minutes) and 75 (minutes)	B1	
(Total fuel needed would be) 155 × 0.4 × 4.55, or 80 × 0.4 × 4.55 + 75 × 0.4 × 4.55	M2	FT 'their number of minutes' provided both parts of the journey are considered and both parts take > 60 minutes Use of '÷2.5' is equivalent to '×0.4' (referred to as 'a product' in the details for M1 and A1) M1 for sight of • product of any two of 155, 0.4 and 4.55 seen, OR • product of any two of 80, 0.4 and 4.55 seen AND product of any two of 75, 0.4 and 4.55 seen AND intention to sum these two products
282(.1) (litres)	A2	CAO, accept 280 (litres) only if 282(.1) seen A1 for sight of any one of the following, provided at least M1 previously awarded: • 0.4 × 705.25 • 0.4 × 364 • 0.4 × 341.25 • 4.55 × 32 • 4.55 × 30 • 4.55 × 62 • 1.82 × 155 • 1.82 × 80 • 1.82 × 75 OR A1 for one of the two stages of evaluating products calculated accurately

9(a)(i) 2.5×10^7	B1	
9(a)(ii) 9600 m^3	B1	
9(b) (Volume seen or implied) 59 700 000 (m^3) or 60 000 000 (m^3) OR (Surface area seen or implied, used as) 4.5(4) or 5	B1	Accept using index notation or standard form, e.g. 59.7×10^6, 5.97×10^7, 60×10^6, 6×10^7 Accept exact or correctly rounded volume written in m^3, i.e. do not accept, e.g. 59 000 000 Ignore any units given
Average depth calculation, e.g. • 59 700 000 ÷ 4 540 000 • 60 000 000 ÷ 4 500 000 • 6000 ÷ 450 • 600 ÷ 45 • 60 000 000 ÷ 5 000 000 • 60 ÷ 5 OR sight of a trial and improvement method with suitable correct calculation(s): • 4.54 × 12 = 54.48 and 4.54 × 13 = 59.02 • 4.54 × 13 = 59.02 and 4.54 × 14 = 63.56 • single calculation (not × 13) between 4.54 × 12.1 = 54.934 and 4.54 × 13.1 = 59.474 • 4.5 × 12 = 54 and 4.5 × 13 = 58.5 • 4.5 × 13 = 58.5 and 4.5 x 14 = 63 • single calculation between 4.5 × 13.1 = 58.95 and 4.5 × 13.4 = 60.3 • 5 × 12 = 60	M1	FT e.g. 'their volume' ÷ 4 540 000 Accept written as a fraction Accept exact or rounded values provided estimates are reasonable *Watch for compensating errors, which is M0 and A0*
Answer in the range 12 (m) to 13.5 (m)	A1	CAO, answer must be in this range, no FT
10(a)(i) Maesystrad AND 46 (minutes)	B1	
10(a)(ii) Rhewlteg AND gives decision used unambiguously as <u>median</u>	B1	Accept decision based on median without the use of the term 'median', e.g. 'half of them took more than 39 minutes' Allow, e.g. • Rhewlteg as median is 38 (minutes) (from misreading the scale correct median is 39 minutes) • Rhewlteg as average is 39 (minutes) Do not accept contradictions, decision needs to be solely based on the median
10(a)(iii) Rhewlteg AND 25 (minutes)	B1	

10(a)(iv) 'Don't know' indicated or unambiguously implied AND reason, e.g. 'not told', 'it doesn't say (on the diagam)', 'doesn't give you the number of students/pupils', 'doesn't tell you how many were asked', 'it is about travel times (not number of students)', 'only gives the timings', 'it shows distribution of travel times, not number of students', 'only shows proportions of the students'	E1	Allow, e.g. 'doesn't give you the frequency (of students)', Do not accept, e.g. 'can't tell', 'not enough data', 'shows only median, range and measures of spread'
10(b)(i) 120 (students)	B1	
10(b)(ii) 23 (minutes)	B1	
11(a) Austria	B1	
11(b) United Kingdom	B1	
11(c) Argentina with appropriate working, e.g. Sight of 13 to 16 (for Argentina) AND 3 to 4 (for Canada)	B2	Accept unlabelled population density, provided not ambiguous or from incorrect working B1 for approximate population /km^2 (for Argentina) 13 to 16 OR (for Canada) 3 to 4 B0 for unsupported answer 'Argentina' or if inappropriate working given, e.g. • 4 × 10 000 000 • 'Canada 34 000 000, Argentina 40 000 000'