GCSE MARKING SCHEME

SUMMER 2019

GCSE
MATHEMATICS – NUMERACY
UNIT 1 - FOUNDATION TIER
3310U10-1

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 (NEW)

SUMMER 2019 MARK SCHEME

GCSE Mathematics-Numeracy **Unit 1: Foundation Tier**	**Mark**	**Comments**
1(a) Rectangle 4cm by 3cm drawn Rectangle drawn at least 3cm from the house AND at least 1 cm from the hedge Rectangle drawn exactly 2 cm from the flower bed	B1 B1 B1	 FT 'their rectangle' FT 'their rectangle'
1(b) 12 (m^2) 15 × 12 (£)180	B1 M1 A1	FT 'their rectangle'. It must be a rectangle or square. This may be seen or implied in a calculation for costs. FT 'their 12' or their derived area. FT 'their 12' × 15 correctly evaluated provided 'their 12' is 6 or more.
1(c) cuboid	B1	
2(a) Level -3	B1	
2(b) (Level) -2	B1	Allow 2-
2(c) -1 + 10 – 5 or -1 + 5 4	M1 A1	May be seen in a diagram. Method may be seen in stages. If no marks award SC1 for appropriate sight of 9 (from -1 + 10)
3(a) 40/100 × £3 × 90 or equivalent e.g. (£)3 × 90 ÷ 10 × 4 (£)108	M2 A1	M1 for: 40/100 × (£)3 (=1.2(0)) OR 40/100 × 90 (=36) OR (£)3 × 90 (=270) These may be implied in workings with other incorrect workings, e.g. 90 ÷ 3(= 30)then 40/100 × (90 ÷ 3) (= 12) ISW E.g. Ignore further working. e.g. 108 + 270 = 378 or 270 – 108 = 162
3(b) 90 ÷ 5 × 8 or equivalent e.g. 90 × 1.6 18 × 8 Or use of 10 miles is 16km **and** 9 × 16 144 (km)	M1 A1	Method may be seen in stages. Calculation that could lead to the correct answer if evaluated correctly.

4(a) (lemonade bought =) 200 × 300 60000 (ml) (number of bottles needed=) 60	M1 A1 B1	 Ignore units at this stage FT 'their 60000' ÷ 1000 correctly evaluated. This may be implied in the cost of the bottles.
(cost of bottles 60 × 90p=) 5400(p) or (£)54	B1	Ignore units at this stage FT 'their 60' × 90 correctly evaluated.
(cost of 3 packets of cups=) (£)12 or 1200(p) (Total cost=) (£)66 or 6600 (p)	B1 B1	 If units are given they must be correct. FT 'their (£)12' + 'their cost of their number of bottles' correctly evaluated provided consistent units are used.
Alternative method *(Number of cups per bottle 1000 ÷ 200 =) 5* *(number of bottles needed=) 300 ÷ 5* *60*	*B1* *M1* *A1*	*This may be embedded e.g. 100 ÷ 5 = 200* *FT 300 ÷ 'their 1000 ÷ 200'* *FT provided correctly evaluated.* *This may be implied in the cost of the bottles.*
(cost of bottles 60 × 90p=) *5400(p) or (£)54*	*B1*	*Ignore units at this stage* *FT 'their 60' × 90 correctly evaluated.*
(cost of 3 packets of cups=) (£)12 or 1200(p) *(Total cost=) (£)66 or 6600 (p)*	*B1* *B1*	*If units are given they must be correct.* *FT 'their (£)12' + 'their cost of their number of bottles' correctly evaluated provided consistent units are used.*
Organisation and communication Writing	OC1 W1	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 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(b) 300 × 50 or 300 × (£)0.5(0) 15000 (p) or (£)150 (profit=150 - 66) (£)84 or 8400(p)	M1 A1 B1	If incorrect units not penalised in (a), penalise -1 once only for inconsistent or incorrect units in (b) Ignore units given at this stage Mark final answer FT 'their 150' - 'their 66' from (a) correctly evaluated provided consistent units are used. If 'their 66' is > 'their 150' allow negative answers from their workings or a statement following their workings that says this is a loss (not a profit).

5. (Snowdon) 6×1000/1000 or 6×900/1000 or 6×950/1000 or 6×940/1000 or 6×945/1000 6(˚C) or 5.4(˚C) or 5.7(˚C) or 5.64(˚C) or 5.67 (˚C) (Kilimanjaro) 6×4000/1000 or 6×5000/1000 or 6×4100/1000 or 6×4080/1000 or 6×4090/1000 or 6×4085/1000 24(˚C) or 30(˚C) or 24.6(˚C) or 24.48(˚C) or 24.54(˚C) or 24.51(˚C)	M1 A1 M1 A1 	Working must be seen ISW Allow answers to calculations to be written as rounded or truncated values. Errors seen in calculations before rounding or truncating award A0 If M0 A0, award SC1 for unsupported answers in the range 5 to 6 inclusive. Working must be seen ISW Allow answers to calculations to be written as rounded or truncated values. Errors seen in calculations before rounding or truncating award A0 If M0 A0, award SC1 for unsupported answers in the range 24 to 25 inclusive.
6. (¼ kg strawberries costs) (£) 2.15 (Mr Thomas pays) 20 – 2.55 OR (Cost of strawberries from £20) 20 – 8.60 ÷ 4 (Cost of 1½ kg raspberries) 20 – 2.55 – 8.60 ÷ 4 (= £) 15.3(0) (Cost of 1 kg raspberries) 15.3(0) ÷ 3 × 2 or 15.3(0) ÷ 1.5 (= £) 10.2(0)	 B1 M1 m1 A1 M1 A1	Penalise -1 only on their first possible A1 for incorrect units. Ignore units not given (=£17.45) (= 20 – 2.15 = £17.85) (=£17.45 - £2.15 or £17.85 – 2.55) Sight of (£)15.3(0) implies all previous marks FT 'their 8.60 ÷ 4' FT 'their 15.3(0)'

7(a)(i) $\frac{3}{8}$	B1	
7(a)(ii) 1 : 1	B1	
7(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 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	E1 B1	Equivalents include: • 12 inches as 30 cm • 6 inches as 15 cm • 9 cm as 3.6 inches • 10 cm as 4 inches B1 implies previous E1 provided 'Shorter than Dieter's sunflower' selected
8(a)(i) (Aled's mum paid) (£) 220 OR (Aled and Gareth pay a total of 660 – 220) (£)440 (660 – 220) ÷ (1 + 9) or 9 × (660 – 220) ÷ (1 + 9) or 44 or 9 × 44 (Aled paid) (£) 44 (Gareth paid) (£) 396	B1 M1 A1 A1	 FT 660 – 'their derived 220' 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
8(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 8(a)(i) Mark as appropriate to candidate's method in 8(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',

8(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 Coat AND Jumper (820 + 320)	B1 B2	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 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
8(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
8(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
8(d)(i) Correctly completed frequency diagram	B1	Bars of correct height (16 and 33) for the missing intervals
8(d)(ii) $1.12 \leq b < 1.16$	B1	

9(a) 24 (miles per gallon)	B1	
9(b) 2.2 (litres)	B1	
9(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
9(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'
9(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
9(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',	E1	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
10(a) 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)
10(b) 202(°) ± 2°	B1	

GCSE MARKING SCHEME

SUMMER 2019

GCSE
MATHEMATICS – NUMERACY
UNIT 2 - FOUNDATION TIER
3310U20-1

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.

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WJEC GCSE MATHEMATICS - NUMERACY (3310U20-1)

SUMMER 2019 MARK SCHEME

GCSE Mathematics – Numeracy Unit 2 Foundation Tier	**Mark**	**Comment**
1(a) 128.9 (pence) × 40 (litres) = (£)51.56	M1 A2	Allow incorrect place value Allow £51.56p A1 for sight of digits 5156 with incorrect place value or units (e.g. £5156 or 5156p or 51.56p) Unsupported sight of digits 5156 implies M1A1 ISW Treat use of 127.9 as MR (-1 from A marks only)
Alternative method *(128.9 (pence) ÷ 100 =) (£)1.289* *(£)1.289 × 40 (litres)* *(£)51.56*	*B1* *M1* *A1*	*B0 for (£)1.28 or (£)1.29* *Allow use of (£)1.28 × 40 (litres) or (£)1.29 × 40 (litres)* *Note: (£)1.28 × 40 (litres) = (£)51.2(0)* *(£)1.29 × 40 (litres) = (£)51.6(0)* *Unsupported (£)51.2(0) or (£)51.6(0) implies B0M1A1 ISW*
1(b) 4438 ÷ 35 126.8 (pence)	M1 A2	Allow 44·38 ÷ 35 A1 for sight of the digits 1268 with incorrect place value or units (e.g.£126.8 or (£)1.268 or (£)1.27 or 127(p)) Unsupported sight of digits 1268 implies M1A1 ISW
2(a) 39 000	B1	
2(b) nineteen thousand, two hundred and fifty-one	B2	B1 for identification of or use of correct value (e.g. sight of 19 251, or words resembling 19 251 with incorrect place value) Allow B1 for one hundred and fifty-two thousand, seven hundred and twenty-one
2(c) 26 332	B1	If no number circled, accept 26 332 in correct place in table
2(d) 146 940	B1	If no number circled, accept 146 940 in correct place in table
2(e) 1 000 000 – 562 016 437 984	M1 A1	M1 for intention of finding the difference. Allow 1×10^n - 562 016 (providing $n \geq 5$) CAO

3(a) ✓ Evidence of counting area Area in range 64 to 71 (cm^2 or m^2) Area × (£)12.50 Answer in range (£)800(.00) – (£)887.5(0)	 M1 A1 M1 A1	 Look at diagram F.T 'their area' × (£)12.50 If units are given than they must be correct. 64 × 12.50 = 800 65 × 12.50 = 812.50 66 × 12.50 = 825 67 × 12.50 = 837.50 68 × 12.50 = 850 69 × 12.50 = 862.50 70 × 12.50 = 875 71 × 12.50 = 887.50
3(b) Circle with radius 3cm centred at P OVERLAY	B2	Allow radius ± 2mm B1 for circle of radius of 3cm not centred at P B1 for circle of diameter of 3cm centred at P B1 for partially completed circle within the tolerance 'Freehand circle' B0 unless within the tolerance on the overlay
3(c) 6m	B1	
4. ✓ (No of SEATED tickets =) 0.35 × 140 = 49 (No of STANDING tickets = 140 – 49 =) 91 (Cost of SEATED tickets =) 49 × (£)84.5(0) OR (Cost of STANDING tickets =) 91 × (£)49.5(0) (Cost of tickets =) (£)4140.5(0) + (£)4504.5(0) (£)8645(.00)	 M1 A1 B1 M1 m1 A1	 Or equivalent full method May be implied in later working FT 'their derived 49'. May be implied in later working FT 'their 49' FT 'their 91' M1 for sight of (£)4140.5(0) OR (£)4504.5(0) FT 'their (£)4140.5(0)' + 'their (£)4504.5(0)'
Organisation and communication Writing	OC1 W1	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 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

5(a) 180(°) – 40(°) – 40(°) 100(°)	M1 A1	Accept embedded answers
5(b) obtuse angle	B1	If incorrect, F.T their answer for angle b in 5(a)
5(c) Full explanation e.g. "(there should be 15 because) 1+2+3+4+5 = 15" "(there should be 15 because) (6)+4+5" "you have to add an extra 9" "it's a triangular number"	E1	Allow "it's 15 because every row goes up one" Accept complete diagram of 15 balls E0 for correctly completed diagram followed by an explanation which contradicts the diagram
5(d) likely	B1	
6(a)(i) $\frac{80 \pm 2}{360}$ or $\frac{20}{90}$ $\frac{2}{9}$	M1 A1	Allow use of '÷' for M1 FT only when simplifying possible, 78/360 = 13/60 81/360 = 9/40 82/360 = 41/180
6(a)(ii) A correct numerator or denominator in any of the following proper fractions: $\frac{3.5}{14.5}$ or $\frac{14}{58}$ or $\frac{7}{29}$ $\frac{7}{29}$	M1 A1	Must be in a proper fraction Allow for sight of 3.5 ÷ 14.5 or 14 ÷ 58 or 7 ÷ 29
6(b) Sight of $\frac{2}{14.5}$ (× 100) or $\frac{8}{58}$ (× 100) 13.79(...%) or 13.8(%) or 14(%)	M1 A1	FT 'their 14.5' or 'their 58' from (a)(ii) provided ≠ 90 If restarting, allow an error in a convincing sum to 'their total' for M1, but A0 Do not accept 13(%) or 13.7(%) (but unsupported this does imply M1)
6(c) (Ffordd Owain) 140(°) ± 2(°) $\frac{140 \pm 2}{360} \times 90$ or (140 ± 2) × 90 ÷ 360 or (140 ± 2) ÷ 360/90 35 (pairs) (Arthur Avenue 4 × 4 =) 16 (pairs of sunglasses) (Difference) 19 (pairs of sunglasses)	B1 M1 A1 B1 B1	May be seen by Saturday on the pie chart May be seen by Saturday on the pie chart Answer must be a whole number. Accept 16 shown on the pictogram unambiguously for Saturday FT 'their Ffordd Owain total' – 'their Arthur Avenue total' for Saturday, provided 'their Ffordd Owain total' ≠ 90 and ≠ 140 ± 2, and 'their Arthur Avenue total' ≠ 4

<table>
<tr>
<td>7(a)

Method to compare, e.g.
• (Per kg price in SuperM) 1000 × 27 ÷ 450
• (1g cost of each, SuperM and FairMart)
27 ÷ 450 and 57 ÷ 1000
• (g per penny for SuperM and FairMart)
450 ÷ 27 and 1000 ÷ 57
• (450g at Fairmart) 57 × 450 ÷ 1000
• (SuperM) 11 × 450(g) with 11× 27(p) AND
(Fairmart) 5 × 1000(g) with 5 × 57(p)

Accurate comparison calculation, e.g.
• (Per kg price in SuperM) 60(p)
• (1g cost of each, SuperM and FairMart)
0.06(p) and 0.057(p)
• (g per penny for SuperM and FairMart)
16.6(66... g per penny and 17.5(4... g per penny)
• (450g at Fairmart) 25.65 (p) (< 27p)
• (SuperM) 4950(g) for (£)2.97 AND
(Fairmart) 5000(g) for (£)2.85

Conclusion, e.g.
‘(Buying carrots from) FairMart (is better value for money.)</td>
<td>

M1

A1

E1</td>
<td>Ignore incorrect units or lack of units for M, A and E marks
Needs to show comparing like quantity with like, unless considering larger quantities where working shows a greater quantity for less money at Fairmart (e.g. 4950g with 5000g)

In cost per kg in SuperM, allow truncation of (1000 ÷ 450 =) 2.222.... to 1 or more decimal places to give 59.4, 59.94, 59.994, etc when × 27(p)
Accept comparison given in pence

<table>
<tr><th></th><th>1 g</th><th>50g</th><th>450g</th><th>1kg</th><th>9kg</th></tr>
<tr><td>SuperM</td><td>0.06 p</td><td>3 p</td><td>27 p</td><td>60 p</td><td>£5.40</td></tr>
<tr><td>FairMart</td><td>0.057 p</td><td>2.85 p</td><td>25.65 p</td><td>57 p</td><td>£5.13</td></tr>
</table>

<table>
<tr><th></th><th>Per 1 p</th><th>Per £1</th></tr>
<tr><td>SuperM</td><td>16.66.. g</td><td>1666.66..g</td></tr>
<tr><td>FairMart</td><td>17.54..g</td><td>1754.36..g</td></tr>
</table>

FT for ‘their costs’ provided M1 previously awarded</td>
</tr>
<tr>
<td>7(b) (Carrots) 2812.5 (g)
(Stock) 5 (litres)
(Cream) 25 (tablespoons)

(Onions) 12 or 13</td>
<td>B2

B1</td>
<td>Mark recipe card as their final answer if complete
Accept 2812(g) or 2813(g) for carrots
Allow 2.812(5) k(g) or 2.813 k(g) ('k' must be inserted)
B1 for any 2 of these 3 answers correct

Must be a whole number of onions

If no marks, award SC1 for answers leading to quantities of carrots, stock and cream in the ratio 450 : 0.8 : 4, e.g. 5625, 10, 50, or
3150, 5.6, 28, or
11250, 20, 100
provided all quantities are increased</td>
</tr>
<tr>
<td>8(a)(i) 18:30, Saturday</td>
<td>B1</td>
<td></td>
</tr>
<tr>
<td>8(a)(ii) 16:00, Saturday</td>
<td>B1</td>
<td></td>
</tr>
<tr>
<td>8(b) 320 ÷ 0.61 or 524(.59…)
525 (AUD)</td>
<td>M1
A1</td>
<td></td>
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</table>

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<tr>
<td>9(a) 3.25 + 4× 2.4(0)
(=) (£)12.85</td>
<td>M1
A1</td>
<td>If no marks, award SC1 for an answer of any of the following:
<table>
<tr><td>Answer</td><td>From</td></tr>
<tr><td>(£)10.45</td><td>3.25 + 3×2.40</td></tr>
<tr><td>(£)11.97 (not for (£)11.96)</td><td>3.25 + 3(38/60) × 2.40</td></tr>
<tr><td>(£)17.4(0)</td><td>3.25 + 4 × 2.40 and incorrect BIDMAS</td></tr>
<tr><td>(£)22.6(0)</td><td>3.25 + 2.40 × 4 and incorrect BIDMAS</td></tr>
</table>
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</tr>
<tr>
<td>9(b) (Minimum time) 61 minutes</td>
<td>B3</td>
<td>B2 for an answer of 1 hour 1 minute
OR
B1 for sight of any one of the following

(8.05–3.25)÷2.4(0)
3.25 + 2.4(0) + 2.4(0) (= 8.05)
4.8(0)÷2.4(0) (= 2 hours)
2 hours

OR an answer of a number of minutes >61 but ≤120</td>
</tr>
</table>

10(a)(i) Reason, e.g. 'find out if too far to go swimming', 'find out if there is a pool nearby', 'interesting to explore between distance people live from the pool and how often they use the pool' 'to find out how far people would travel to get to the sports centre', 'show relationship between how frequently they go swimming and distance travelled', 'see how far people travelled', 'to analyse the distance people travelled', 'to find out if people who live close by go more often', 'distance can affect participation'	E1	Allow, e.g. 'to see whether people close by use the **gym** more', 'shows how far people are willing travel', 'people who live close by go more often', 'distance affects participation' Do not accept, e.g. 'not a biased question', 'anyone can answer it', 'it would give a numerical answer', 'to see how people go to the sports centre', 'data can be grouped', 'data can be analysed'
10(a)(ii) Difficult to analyse because..., e.g. 'no categories', 'vague (question)', 'it is not specific', 'need time frame', 'it could be weeks, months, years' 'don't know what often means', 'no time period given', 'it is an open question', 'may not be about swimming in this sports centre'	E1	Do not accept, e.g. 'they may not remember', 'they don't know', 'they might not go swimming'
10(a)(iii) Appropriate **question** and at least 3 suitable categories with no gaps or overlaps, e.g. 'under 20 minutes, 20 minutes to one hour, more than one hour', '1 hour or less, more than 1 hour but less than 2 hours, 2 hours or more'	B2	Ignore gaps in continuous data provided not greater than 1 minute Allow 2 suitable groups with the third group as 'more' or similar Accept if options do not start at zero, provided the first option starts below 31 minutes Provided an appropriate question is given: Working in **minutes** allow: • B2 for 0 – 30, 31 – 40, 41 – 50 • B1 for 0 – 30, 30 – 50, 50 – 70 Working in **hours** allow B1 for any of the following • 0 – 1, 1 – 2, 2 – 3 • 0 – 1, 2 – 3, 4 – 5 Award B1, if the B2 criteria would be met apart from having any one of the following errors: • First option starts between 31 minutes and 1 hour as lower bound, • There is a missing or inappropriate question • Poor or incorrect use of inequalities is seen
10(b)(i) 4 (°C)	B1	(28 – 24 = 4) Do not accept from incorrect working, e.g. 29 – 25
10(b)(ii) 36 (minutes)	B1	Accept answers in the inclusive range 35 minutes to 37 minutes

GCSE MARKING SCHEME

SUMMER 2019

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

INTRODUCTION

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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>
</tr>
<tr>
<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>
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<tr>
<td>5(b)(i) 375 (cm^2)</td>
<td>B1</td>
<td></td>
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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 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 Answer in the range 12 (m) to 13.5 (m)	B1 M1 A1	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 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* 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'

GCSE MARKING SCHEME

SUMMER 2019

GCSE
MATHEMATICS – NUMERACY
UNIT 2 - INTERMEDIATE TIER
3310U40-1

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 (3310U40-1)

SUMMER 2019 MARK SCHEME

GCSE Mathematics - Numeracy **Unit 2: Intermediate Tier**	**Mark**	**Comments**
1(a)(i) $\frac{80 \pm 2}{360}$ or $\frac{20}{90}$ $\frac{2}{9}$	M1 A1	Allow use of '÷' for M1 FT only when simplifying possible, 78/360 = 13/60 81/360 = 9/40 82/360 = 41/180
1(a)(ii) A correct numerator or denominator in any of the following proper fractions: $\frac{3.5}{14.5}$ or $\frac{14}{58}$ or $\frac{7}{29}$ $\frac{7}{29}$	M1 A1	Must be in a proper fraction Allow for sight of 3.5 ÷ 14.5 or 14 ÷ 58 or 7 ÷ 29
1(b) Sight of $\frac{2}{14.5}$ (× 100) or $\frac{8}{58}$ (× 100) 13.79(...%) or 13.8(%) or 14(%)	M1 A1	FT 'their 14.5' or 'their 58' from (a)(ii) provided ≠ 90 If restarting, allow an error in a convincing sum to 'their total' for M1, but A0 Do not accept 13(%) or 13.7(%) (but unsupported this does imply M1)
1(c) (Ffordd Owain) 140(°) ± 2(°) $\frac{140 \pm 2}{360}$ × 90 or (140 ± 2) × 90 ÷ 360 or (140 ± 2) ÷ 360/90 35 (pairs) (Arthur Avenue 4 × 4 =) 16 (pairs of sunglasses) (Difference) 19 (pairs of sunglasses)	B1 M1 A1 B1 B1	May be seen by Saturday on the pie chart May be seen by Saturday on the pie chart Answer must be a whole number. Accept 16 shown on the pictogram unambiguously for Saturday FT 'their Ffordd Owain total' – 'their Arthur Avenue total' for Saturday, provided 'their Ffordd Owain total' ≠ 90 and ≠ 140 ± 2, and 'their Arthur Avenue total' ≠ 4

<table>
<tr>
<td>2(a)

Method to compare, e.g.
• (Per kg price in SuperM) 1000 × 27 ÷ 450
• (1g cost of each, SuperM and FairMart)
27 ÷ 450 and 57 ÷ 1000
• (g per penny for SuperM and FairMart)
450 ÷ 27 and 1000 ÷ 57
• (450g at Fairmart) 57 × 450 ÷ 1000
• (SuperM) 11 × 450(g) with 11× 27(p) AND
(Fairmart) 5 × 1000(g) with 5 × 57(p)

Accurate comparison calculation, e.g.
• (Per kg price in SuperM) 60(p)
• (1g cost of each, SuperM and FairMart)
0.06(p) and 0.057(p)
• (g per penny for SuperM and FairMart)
16.6(66... g per penny and 17.5(4... g per penny)
• (450g at Fairmart) 25.65 (p) (< 27p)
• (SuperM) 4950(g) for (£)2.97 AND
(Fairmart) 5000(g) for (£)2.85

Conclusion, e.g.
‘(Buying carrots from) FairMart (is better value for money.)’

Organisation and communication

Writing</td>
<td>

M1

A1

E1

OC1

W1</td>
<td>Ignore incorrect units or lack of units for M, A and E marks
Needs to show comparing like quantity with like, unless considering larger quantities where working shows a greater quantity for less money at Fairmart (e.g. 4950g with 5000g)

In cost per kg in SuperM, allow truncation of (1000 ÷ 450 =) 2.222.... to 1 or more decimal places to give 59.4, 59.94, 59.994, etc when × 27(p)
Accept comparison given in pence

<table>
<tr><th></th><th>1 g</th><th>50g</th><th>450g</th><th>1kg</th><th>9kg</th></tr>
<tr><td>SuperM</td><td>0.06 p</td><td>3 p</td><td>27 p</td><td>60 p</td><td>£5.40</td></tr>
<tr><td>FairMart</td><td>0.057 p</td><td>2.85 p</td><td>25.65 p</td><td>57 p</td><td>£5.13</td></tr>
</table>

<table>
<tr><th></th><th>Per 1 p</th><th>Per £1</th></tr>
<tr><td>SuperM</td><td>16.66.. g</td><td>1666.66..g</td></tr>
<tr><td>FairMart</td><td>17.54..g</td><td>1754.36..g</td></tr>
</table>

FT for ‘their costs’ provided M1 previously awarded

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

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>
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<tr>
<td>2(b) (Carrots) 2812.5 (g)
(Stock) 5 (litres)
(Cream) 25 (tablespoons)

(Onions) 12 or 13</td>
<td>B2

B1</td>
<td>Mark recipe card as their final answer if complete
Accept 2812(g) or 2813(g) for carrots
Allow 2.812(5) k(g) or 2.813 k(g) ('k' must be inserted)
B1 for any 2 of these 3 answers correct

Must be a whole number of onions

If no marks, award SC1 for answers leading to quantities of carrots, stock and cream in the ratio 450 : 0.8 : 4, e.g. 5625, 10, 50, or
3150, 5.6, 28, or
11250, 20, 100
provided all quantities are increased</td>
</tr>
</table>

<table>
<tr><td>3(a)(i) 18:30, Saturday</td><td>B1</td><td></td></tr>
<tr><td>3(a)(ii) 16:00, Saturday</td><td>B1</td><td></td></tr>
<tr><td>3(b) 320 ÷ 0.61 or 524(.59…)
525 (AUD)</td><td>M1
A1</td><td></td></tr>
<tr><td>4(a) 3.25 + 4× 2.4(0)
(=) (£)12.85</td><td>M1
A1</td><td>If no marks, award SC1 for an answer of any of the following:<table><tr><td>Answer</td><td>From</td></tr><tr><td>(£)10.45</td><td>3.25 + 3×2.40</td></tr><tr><td>(£)11.97 (not for (£)11.96)</td><td>3.25 + 3(38/60) × 2.40</td></tr><tr><td>(£)17.4(0)</td><td>3.25 + 4 × 2.40 and incorrect BIDMAS</td></tr><tr><td>(£)22.6(0)</td><td>3.25 + 2.40 × 4 and incorrect BIDMAS</td></tr></table></td></tr>
<tr><td>4(b) (Minimum time) 61 minutes</td><td>B3</td><td>B2 for an answer of 1 hour 1 minute
OR
B1 for sight of any one of the following
(8.05–3.25)÷2.4(0)
3.25 + 2.4(0) + 2.4(0) (= 8.05)
4.8(0)÷2.4(0) (= 2 hours)
2 hours
OR an answer of a number of minutes >61 but ≤120</td></tr>
<tr><td>5(a)(i) Reason, e.g.
‘find out if too far to go swimming’,
‘find out if there is a pool nearby’,
‘interesting to explore between distance people live from the pool and how often they use the pool’
‘to find out how far people would travel to get to the sports centre’,
‘show relationship between how frequently they go swimming and distance travelled’,
‘see how far people travelled’,
‘to analyse the distance people travelled’,
‘to find out if people who live close by go more often’,
‘distance can affect participation’</td><td>E1</td><td>Allow, e.g.
‘to see whether people close by use the gym more’,
‘shows how far people are willing travel’,
‘people who live close by go more often’,
‘distance affects participation’

Do not accept, e.g.
'not a biased question',
‘anyone can answer it’,
‘it would give a numerical answer’,
‘to see how people go to the sports centre’,
‘data can be grouped’,
‘data can be analysed’</td></tr>
<tr><td>5(a)(ii) Difficult to analyse because..., e.g.
‘no categories’,
‘vague (question)’,
‘it is not specific’,
'need time frame',
‘it could be weeks, months, years’
'don't know what often means',
‘no time period given’,
‘it is an open question’,
‘may not be about swimming in this sports centre’</td><td>E1</td><td>Do not accept, e.g.
‘they may not remember’,
‘they don’t know’,
‘they might not go swimming’</td></tr>
</table>

5(a)(iii) Appropriate **question** and at least 3 suitable categories with no gaps or overlaps, e.g. 'under 20 minutes, 20 minutes to one hour, more than one hour', '1 hour or less, more than 1 hour but less than 2 hours, 2 hours or more'	B2	Ignore gaps in continuous data provided not greater than 1 minute Allow 2 suitable groups with the third group as 'more' or similar Accept if options do not start at zero, provided the first option starts below 31 minutes Provided an appropriate question is given: Working in **minutes** allow: • B2 for 0 – 30, 31 – 40, 41 – 50 • B1 for 0 – 30, 30 – 50, 50 – 70 Working in **hours** allow B1 for any of the following • 0 – 1, 1 – 2, 2 – 3 • 0 – 1, 2 – 3, 4 – 5 Award B1, if the B2 criteria would be met apart from having any one of the following errors: • First option starts between 31 minutes and 1 hour as lower bound, • There is a missing or inappropriate question • Poor or incorrect use of inequalities is seen
5(b)(i) 4 (°C)	B1	(28 – 24 = 4) Do not accept from incorrect working, e.g. 29 – 25
5(b)(ii) 36 (minutes)	B1	Accept answers in the inclusive range 35 minutes to 37 minutes
6(a)(i) 8	B1	
6(a)(ii) 180	B1	
6(a)(iii) Sight of total 403 (100 ×) $\frac{15}{403}$ or (100 ×) 15 ÷ 403 3.7 (%)	B1 M1 A2	FT 'their 180' + 223 FT correctly evaluated 'their 180' + 223 Mark final answer A1 for 3.72(...%) or from correct working 4(%) If no marks, award SC1 for 100 ×15 ÷'their total' correctly evaluated or SC2 for this answer rounded correctly to 1 decimal place (Note: SC1 for 100 × 15 ÷ 388 = 3.8(6...%) or SC2 if rounded to 3.9(%))

6(b) 72 000	B1	
6(c) Sight of 9.95 (m) or 99.95(m) or 995 (cm) or 9995 (cm) (Least length) 9.95 + 99.95 + 9.95 or equivalent in cm 119.85 (m)	B1 M1 A1	If units are given they must be correct FT 'their least measurements' x and y, provided 9.9 (m) ≤ x <10(m) and 99.9 (m) ≤ y <100(m) as appropriate CAO Award all 3 marks for a correct response If no marks, award SC1 for an answer of 118.5(m) or 119.985(m) or (9.95 + 9.95 + 99.5 =) 119.4(m)
6(c) Alternative method: *100 + 10 + 10 – 3 × 0.05 or equivalent in cm* *119.85 (m)*	*M2* *A1*	*M1 for sight of - 5 cm or -0.05 (m) used* *CAO* *If no marks, award SC1 for an answer of 119.7.(m)*
7(a)(i) (Volume) $\pi \times 3.6^2 \times 9.3$ Answer in the range 378.4 (cm^3) to 378.7 (cm^3) 378 (cm^3) or 379 (cm^3)	M1 A1	Mark final answer
7(a)(ii) 189 (g) or an answer in the range 189.2 (g) to 189.5 (g)	B1	Allow rounding or truncation to whole number or a number of decimal places FT, for a similar range, 'their 379' accurately divided by 2
7(b) (Height is) 9.3 × 4.2 ÷ 3.6 or 1.16666... × 9.3 or 9.3 ÷ (3.6 ÷ 4.2) or equivalent 10.85 (cm)	M1 A1	Allow M1 for 1.16 × 9.3 or 1.17 × 9.3 or 9.3 ÷ 0.85(7...) Allow answers in the inclusive range 10.78 (cm) to 10.95 (cm)

7(c) Comparison of salt and sugar, e.g. • (Salt) $\frac{6}{1.85}$ AND (Sugar) $\frac{90}{11.7}$ • (Salt)(100×) $\frac{1.85}{6}$ AND (Sugar)(100×) $\frac{11.7}{90}$ • (Recommend) 1 : 15 AND (Beans)1 : 11.7÷1.85 Conclusion SALT and an accurate calculation of comparison, e.g. 3(.24...) AND 7(.69...), 0.3(083...) AND 0.13, 30(.83....%) AND 13(%), 31(%) AND 13(%), 0.31 AND 0.13 1 : 15 AND 1 : 6(.32...)	B1 B2	Or equivalent Ignore any units given Ignore any units given and any additional statements if SALT unambiguously concluded with appropriate calculations evaluated correctly Accept rounded or truncated answers Ignoring units, B1 for an accurate calculation of comparison, e.g. 3(.24...) AND 7(.69...), 0.3(083...) AND 0.13, 30(.83....%) AND 13(%), 31(%) AND 13(%) 1 : 15 AND 1 : 6(.32...) OR B1 for SALT with one of the two comparative values correct (i.e. as above with 'OR')
7(c) Alternative method 1: *Conclusion SALT with evidence of a full method looking at the same number of portions, including ratio methods, e.g.* *1.85 × 3 (portions) ≈ 6 (g)* *AND 11.7 × 8 (portions) ≈ 90 (g)*	*B3*	*Allow approximately or similar words for '≈'* *B2 for evidence of, e.g.* *1.85 × 3(portions) ≈ 6(g)* ***and*** *11.7 × 8(portions) ≈ 90(g)* *OR* *B1 for conclusion SALT with evidence of, e.g.* *1.85 × 3 (portions) ≈ 6 (g)* ***or*** *11.7 × 8 (portions) ≈ 90 (g)*
7(c) Alternative method 2: *Full method with one calculated proportion, compared with same proportion of the other ingredient, e.g.* • *31% salt with 0.31 × 90* • *13% sugar with 0.13 × 6* *Conclusion SALT and an accurate calculation of comparison, e.g.* • *27.9 (g) (sugar which is > 11.7 g in a portion)* • *0.78 (g) (salt which is < 1.85 g in a portion)*	*B1* *B2*	 *Ignore any units given and any additional statements if SALT unambiguously concluded with appropriate calculations evaluated correctly* *B1 for appropriate calculations evaluated correctly, with no or incorrect conclusion*

8(a) (Number of units is) 800	B1	
(Electricity cost is) 800 × 0.23 or 800 × 23	M1	FT 'their 20950 – 20150', must be from attempting this subtraction
(£)184 or 18400(p)	A1	If units are given they must be correct Accept £184.00p, do not accept £184p
(Standing charge + electricity) (£) 208 or 20800(p)	B1	FT 24 + 'their 184' provided units are consistent May be implied or embedded in further work, e.g. if 184 × 1.05 + 24 seen and calculated correctly to (£)217.2(0)
(Total bill including VAT at 5%) 1.05 × 208 or 1.05 × 20800 or equivalent	M1	FT 'their (£)208' or 'their 20800(p)', including if the standing charge is omitted (i.e. (£)184 used) Allow if standing charge is added after adding VAT to the electricity cost
(£)218.4(0) or 21840(p)	A1	CAO
(Budget per month £218.40 ÷ 3 =) (£)72.8(0) or 7280(p)	B1	FT 'their total bill' ÷ 3 provided at least 2 marks previously awarded Allow rounded up to the nearest £ On FT allow rounding to 10p, or rounding up to the nearest £ (Note: FT answers from • one month standing charge (£)201.6(0))÷ 3 = (£)67.2(0) • standing charge omitted (£)193.2(0))÷ 3 = (£)64.4(0))
8(a) Alternative method:		*Watch for stages in other orders, check for embedded equivalent stages*
(Number of units is) 800	*B1*	
(Electricity cost is) 800 × 0.23 or 800 × 23	*M1*	*FT 'their 20950 – 20150', must be from attempting this subtraction*
(£)184 or 18400(p)	*A1*	*If units are given they must be correct* *Accept £184.00p, do not accept £184p*
(Budget before VAT 184÷3 + 24÷3 =) (£) 69.33(3..)	*B1*	*FT 'their 184'+ 8 provided units are consistent* *May be implied or embedded in further work, e.g. if (184÷3)×1.05 + 8 seen and calculated correctly to (£)72.4(0)*
(Total bill including VAT at 5%) *1.05 × (184 ÷ 3 + 24 ÷ 3) or equivalent*	*M2*	*FT 'their 184 ÷ 3 + 24 ÷ 3'* *M1 for either of the following:* • *1.05 × 'their 184 ÷ 3'* *(no standing charge included)* • *1.05 × 'their 184 ÷ 3' + 8* *(no VAT on standing charge)*
(Budget per month) (£)72.8(0) or 7280(p)	*A1*	*FT from M2 or M1* *Allow rounded up to the nearest £* *On FT allow rounding to 10p, or rounding up to the nearest £*

8(b) $500 \times 1.022^5 \times 1.016^{15}$ $(500 \times 1.022^5 = 557.473...)$ $(500 \times 1.016^{15} = 634.418...$ or $634.42)$ (£) 707.34	M3 A1	OR equivalent method to increase by 2.2% and to increase by 1.6% on different amounts for appropriate number of years M2 for sight of either $\times 1.022^5$ or $\times 1.016^{15}$ or equivalent calculations OR M1 for sight of either $\times 1.022$ or $\times 1.016$ or equivalent calculations Mark final answer, CAO, accepting answers in the range (£) 707.33 to (£) 707.35 (Note: Sight of (£)511 or (£)555 implies 500×1.022, from working with 2.2% of £500, M1 is awarded)
9(a)(i) $(Support1^2 =) 0.9^2 + 1.1^2$ $Support1^2 = 2.02$ or $(Support1 =) \sqrt{2.02}$ (Support 1 =) 1.4(2... m)	 M1 A1 A1	*Scale drawings are not accepted* Do not accept rounded to 2, unless final answer is 1.42(1... m)** FT from M1 for the correctly evaluated square root of 'their 2.02' provided 'their answer' > 1.1 (m) ***Note, award as follows:* *$(Support1^2 =) 0.9^2 + 1.1^2$* *M1* *$Support1^2 = 2$ or $(Support1 =) \sqrt{2}$* *A0* *(Support 1 =) 1.4(1... m)* *A1 FT* *$(Support1^2 =) 0.9^2 + 1.1^2$* *M1* *$Support1^2 = 2$ or $(Support1 =) \sqrt{2}$* *Allow A1 if ...* *(Support 1 =) 1.42(... m)* *A1 FT*
9(a)(ii) sin base angle = $\frac{1.1 + 0.8}{2.6}$ $\sin^{-1} \frac{1.1 + 0.8}{2.6}$ or $\sin^{-1} 0.73(0769....)$ (Base angle =) 46.95(...°) or 47(°)	M1 m1 A1	OR alternative full method using Pythagoras' theorem then cos or tan OR FT correct statement for 'their inverse trig ratio' Allow 46.88(...°) or 46.9(°) ISW unless subtracted from 90° If no marks, award SC1 for an answer of 50.7(°) or 51(°) from working with Support 1
9(b) (Discount cost of bricks) $(516 - 8 \times 22.5(0) =)$ (£) 336 $100 \times 336 \div 80$ or $100 \times \frac{336}{80}$ (£) 420	B1 M1 A1	 FT 'their $516 - 8 \times 22.5(0)$' provided $\neq 516$ and $\neq 180$ for M1 and possible A1 If no marks, award SC2 for $(516 \div 0.8 - 180 =)$ (£) 465 OR SC1 for $(516 \div 0.8 =)$ (£) 645 or $(100 \times 180 \div 80 =)$ (£) 225

10(a)(i) 120	B1	
10(a)(ii) $1800 \leq x < 2000$	B1	Accept '(£)1800 to (£)2000', or '(£)1800 – (£)2000'
10(a)(iii) Reason based on agreement due to the 4 people earning £5800 to £7800 per month or the majority of lower wages, e.g. 'the data is skewed', 'only a few of the employees will earn more than the mean wage', 'because most people employed are in the lowest 2 groups of the monthly wage' 'as the majority earn between 1800 and 2100'	E1	Allow, e.g. 'because there is a great difference between the monthly wages', 'the big numbers would affect the mean', 'more than half are in the first group' Do not accept, e.g. 'she doesn't know the exact values', 'using the median would be better', 'because there are no employees that have between 2400 and 5800 monthly wage', 'there are 64 in the first group'
10(b)(i) (2200, 48) joined to (2400, 72) joined to (3000, 80)	B2	Joined with a curve or a straight line B1 for a cumulative graph with either of the following: • correct plots but not joined, • 'their 2 plots' joined provided 1 plot 'correct' including FT plot at (3000, $48 < y \leq 80$)
10(b)(ii) £2160	B1	
10(b)(iii) 22.5(%) OR answer from correct working in the range 21(.25%) to 23.75(%) or 24(%)	B2	Working $\frac{17}{80} \times 100$ to $\frac{19}{80} \times 100$ B1 for sight of $\frac{17}{80}$ to $\frac{19}{80}$

GCSE MARKING SCHEME

SUMMER 2019

GCSE
MATHEMATICS – NUMERACY
UNIT 1 - HIGHER TIER
3310U50-1

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 (3310U50-1)

SUMMER 2019 MARK SCHEME

<table>
<tr><th>GCSE Mathematics – Numeracy
Unit 1: Higher Tier</th><th>Mark</th><th>Comments</th></tr>
<tr><td>1. (Value sum dimensions) 40+25+30 (S = 95)

(Value area largest face) 30 × 40 (F = 1200)

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

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))

(=) (£) 5.18</td><td>B1

B1

B1

M1

A1</td><td>Not a FT mark

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

Examples of possible FT answers:
<table><tr><th>Sum of values</th><th>Cost in £</th></tr><tr><td>680</td><td>2.72</td></tr><tr><td>740</td><td>2.96</td></tr><tr><td>755</td><td>3.02</td></tr><tr><td>820</td><td>3.28</td></tr><tr><td>1080</td><td>4.32</td></tr><tr><td>1095</td><td>4.38</td></tr><tr><td>1160</td><td>4.64</td></tr><tr><td>1280</td><td>5.12</td></tr><tr><td>1360</td><td>5.44</td></tr></table></td></tr>
<tr><td>2(a)
Correct position indicated</td><td>B3</td><td>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)</td></tr>
<tr><td>2(b) Answer in the range 102 to 110 (metres)</td><td>B1</td><td></td></tr>
</table>

3(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
3(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*
3(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 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 shown, need to show further hexagons

4(a) 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
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(b) (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

5(a)(i) 2.5×10^7	B1	
5(a)(ii) 9600 m^3	B1	
5(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 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 Answer in the range 12 (m) to 13.5 (m)	B1 M1 A1	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 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* CAO, answer must be in this range, no FT

6(a)(i) Maesystrad AND 46 (minutes)	B1	
6(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
6(a)(iii) Rhewlteg AND 25 (minutes)	B1	
6(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'
6(b)(i) 120 (students)	B1	
6(b)(ii) 23 (minutes)	B1	
7(a) Austria	B1	
7(b) United Kingdom	B1	
7(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'
8(a) 401 (cm^2)	B1	
8(b) A correct evaluation of $(4^{7/2} =)$ 128 OR $(4^{5/2} =)$ 32 $(400 + 4^{7/2}) - (400 + 4^{5/2})$ OR $4^{7/2} - 4^{5/2}$ or equivalent $= 96$ (cm^2)	B1 M1 A1	or sight of appropriate 528 OR 432 (528 – 432 OR 128 – 32) CAO

9. Use of 275 (volts) AND 285 (volts) OR Use of 0.15 (amps) AND 0.25 (amps) $\frac{V}{I} = R$ (Least possible value of R =) $\frac{275}{0.25}$ = 1100 (ohms) (Greatest possible value of R =) $\frac{285}{0.15}$ = 1900 (ohms)	 B1 B1 M1 A1 M1 A1	Accept use of $0.24\dot{9}$ and $284.\dot{9}$ throughout, but do not accept use of 0.249 and 284.9 May be implied in further working FT 'their 275' provided 270 $\leq$ V < 280 AND 'their 0.25' provided 0.2 < I $\leq$ 0.3 CAO FT 'their 285' provided 280 < V $\leq$ 290 AND 'their 0.15' provided 0.1 $\leq$ I < 0.2 CAO
10. $AO^2 = 100^2 - 80^2$ or (AO =) $\sqrt{100^2 - 80^2}$ $AO^2 = 3600$ or (AO =) $\sqrt{3600}$ or (AO =) 60 (cm) $AE^2 = 110^2 + 3600$ or equivalent OR (AE =) $\sqrt{110^2 + 60^2}$ or equivalent AE = $\sqrt{15700}$ (cm) ISW	M1 A1 M1 A1	Allow use of $20 \times \sqrt{(5^2 - 4^2)}$ If $\sqrt{3600}$ evaluated, mark final answer FT 'their derived 3600' or 'their derived 60' but not use of 100 or 80 for AO Or $10\sqrt{157}$
Alternative method: *$AO^2 = 100^2 - 80^2$ or (AO =) $\sqrt{100^2 - 80^2}$* *(AE =) $\sqrt{100^2 - 80^2 + 110^2}$* *AE = $\sqrt{15700}$ (cm) ISW*	*M1* *M2* *A1*	*M1 for $100^2 - 80^2 + 110^2$* *Or $10\sqrt{157}$* *If no marks awarded,* *SC2 for $\sqrt{100^2 + 80^2 + 110^2}$ leading to an answer of $\sqrt{28500}$ ISW, or* *SC1 for $100^2 + 80^2 + 110^2$*

11(a) (Area =) $\frac{1}{2} \times 2 \times (0 + 0 + 2(2 + 4 + 4.4 + 4 + 2.6))$ OR $\frac{1}{2} \times 2 \times (4 + 8 + 8.8 + 8 + 5.2)$ $= 34\ (mm^2)$	M2 A1	Award M1 if only one reading incorrect FT from M1
(Volume =) $34 \times 3 \quad (\times 2)$ $= 204\ (mm^3)$	M1 A1	FT from M1 or M2 for a possible M1A1 If no marks previously awarded, FT 'their 34' provided an attempt made to use the trapezium rule for a possible M1 only
Alternative method: $\frac{(0 + 2)}{2} \times 2 + \frac{(2 + 4)}{2} \times 2 + \frac{(4 + 4.4)}{2} \times 2 +$ $\frac{(4.4 + 4)}{2} \times 2 + \frac{(4 + 2.6)}{2} \times 2 + \frac{(2.6 + 0)}{2} \times 2$ *[2 + 6 + 8.4 + 8.4 + 6.6 + 2.6]* $= 34\ (mm^2)$	*M2* *A1*	*Each area may be seen as the sum of the area of a rectangle and a triangle* *M1 for the sum of these 6 areas with one error (maybe repeated) in reading the scale OR with 1 incorrect term* *FT from M1 or M2*
(Volume =) 34 × 3 (× 2) $= 204\ (mm^3)$	*M1* *A1*	*FT from M1 or M2 for a possible M1A1* *If no marks previously awarded, FT 'their 34' provided an attempt made to sum the 6 areas for a possible M1 only*
11(b) 30 × (number of pendants made) ÷ 240 or equivalent (Number of circular pendants in sample =) 12 Sight of any 2 of 6.5, 3.7(5), 7.7(5) or equivalents (Number in sample =) 6, 12, 4, 8	M1 A1 A1 B1	e.g. (number of pendants made) ÷ 8 Sight of this calculation for any shaped pendant Accept mixed numbers Needs to be from correct working Can come from M1A1A0 An unsupported 6, 12, 4, 8 is awarded M1A1A0B1 An unsupported 7, 12, 4, 8 is awarded M1A1A0B0

11(c) (Volume of sphere =) $\frac{4}{3} \times \pi \times 30^3$ (= 36000π)	B1	
$\pi \times \text{radius}^2 \times 40$ (× 5) = $\frac{4}{3} \times \pi \times 30^3$	M1	FT 'their derived volume of sphere'
$\text{radius}^2 = \frac{4 \times \pi \times 30^3}{3 \times \pi \times 40 (\times 5)}$ or equivalent	m1	e.g. $\text{radius}^2 = \frac{36000\pi}{\pi \times 40 (\times 5)}$
$\text{radius}^2 = 180$ or (radius =) $\sqrt{180}$	A1	CAO
$= 6\sqrt{5}$ (mm)	B2	For B2, FT 'their derived 180' provided their 'b' is as small as possible and that 'their derived 180' can be simplified If 'their derived 180' is a square number, then B1 only can be awarded for the correct square root of 'their 180' For B1, FT 'their derived 180' B1 for writing 180 as a product of 2 or more factors where one of the factors OR the product of a pair of their factors is a square number e.g. 4 × 45, 3 × 3 × 20, OR B1 for writing $\sqrt{180}$ as a product of 2 or more factors where one of the factors OR the product of a pair of their factors is a whole number e.g. $\sqrt{5} \times \sqrt{12} \times \sqrt{3}$

12(a)(i) e.g. $100x = 8.333\ldots$, $1000x = 83.333\ldots$ AND an attempt to subtract both sides $= \frac{75}{900}$ or $\frac{825}{9900}$ or $\frac{8325}{99900}$ or equivalent $= \frac{1}{12}$	M1 A1 A1	 Allow A1 for e.g. 7.5/90 FT from M1A0 provided of equivalent difficulty
12(a)(ii) (Area =) $\frac{1}{12} \times \pi \times 120^2$ or equivalent $= 1200\pi$ (cm^2)	 M1 A1	FT 'their 1/12' from (i) throughout If no marks awarded, SC1 for ($11/12 \times \pi \times 120^2$ or equivalent =) 13200π (cm^2)
12(b) Sight of $\frac{x}{360} \times 2 \times \pi \times 36$ or equivalent $\frac{x}{360} \times 2\times\pi\times36 + 90 = 200$ or equivalent $\frac{x}{360} \times 2\times\pi\times36 = 200 - 90$ or equivalent $\frac{x}{5} \times \pi = 200 - 90$ OR $(x =) \frac{(200 - 90) \times 360}{2\times\pi\times36}$ $x = \frac{550}{\pi}$	B1 M1 m1 m1 A1	e.g. $\frac{x}{5} \times \pi$. Accept any symbol for x These two m1 marks can be done in any order For isolating the x term For fully simplifying the fraction correctly OR for isolating x Needs to come from convincing work from M1m1m1 e.g. $\frac{39600}{72\pi}$ or $\frac{110 \times 360}{72\pi}$ If no marks awarded or B1 only awarded, then SC1 for $\frac{550}{360\pi} \times 2 \times \pi \times 36$ or equivalent AND possibly another SC1 for convincing work showing that this simplifies to 110, and that 110 + 90 = 200

GCSE MARKING SCHEME

SUMMER 2019

GCSE
MATHEMATICS – NUMERACY
UNIT 2 - HIGHER TIER
3310U60-1

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 (3310U60-1)

SUMMER 2019 MARK SCHEME

GCSE Mathematics – Numeracy **Unit 2: Higher Tier**	**Mark**	**Comments**
1. Sight of 9.95 (m) or 99.95(m) or 995 (cm) or 9995 (cm) (Least length) 9.95 + 99.95 + 9.95 or equivalent in cm 119.85 (m)	B1 M1 A1	If units are given they must be correct FT 'their least measurements' x and y, provided 9.9 (m) ≤ x <10(m) and 99.9 (m) ≤ y <100(m) as appropriate CAO Award all 3 marks for a correct response If no marks, award SC1 for an answer of 118.5(m) or 119.985(m) or (9.95 + 9.95 + 99.5 =) 119.4(m)
1. Alternative method: *100 + 10 + 10 – 3 × 0.05 or equivalent in cm* *119.85 (m)*	*M2* *A1*	*M1 for sight of - 5 cm or -0.05 (m) used* *CAO* *If no marks, award SC1 for an answer of 119.7.(m)*
2(a)(i) (Volume) $\pi \times 3.6^2 \times 9.3$ Answer in the range 378.4 (cm^3) to 378.7 (cm^3) or 379 (cm^3)	M1 A1	Mark final answer
2(a)(ii) 189 (g) or an answer in the range 189.2 (g) to 189.5 (g)	B1	Allow rounding or truncation to whole number or a number of decimal places FT, for a similar range, 'their 379' accurately divided by 2
2(b) (Height is) 9.3 × 4.2 ÷ 3.6 or 1.16666... × 9.3 or 9.3 ÷ (3.6 ÷ 4.2) or equivalent 10.85 (cm)	M1 A1	Allow M1 for 1.16 × 9.3 or 1.17 × 9.3 or 9.3 ÷ 0.85(7...) Allow answers in the inclusive range 10.78 (cm) to 10.95 (cm)

2(c) Comparison of salt and sugar, e.g. • (Salt) $\frac{6}{1.85}$ AND (Sugar) $\frac{90}{11.7}$ • (Salt)(100×) $\frac{1.85}{6}$ AND (Sugar)(100×) $\frac{11.7}{90}$ • (Recommend) 1 : 15 AND (Beans)1 : 11.7÷1.85 Conclusion SALT and an accurate calculation of comparison, e.g. 3(.24...) AND 7(.69...), 0.3(083...) AND 0.13, 30(.83....%) AND 13(%), 31(%) AND 13(%), 0.31 AND 0.13 1 : 15 AND 1 : 6(.32...)	B1 B2	Or equivalent Ignore any units given Ignore any units given and any additional statements if SALT unambiguously concluded with appropriate calculations evaluated correctly Accept rounded or truncated answers Ignoring units, B1 for an accurate calculation of comparison, e.g. 3(.24...) AND 7(.69...), 0.3(083...) AND 0.13, 30(.83....%) AND 13(%), 31(%) AND 13(%) 1 : 15 AND 1 : 6(.32...) OR B1 for SALT with one of the two comparative values correct (i.e. as above with 'OR')
2(c) Alternative method 1: *Conclusion SALT with evidence of a full method looking at the same number of portions, including ratio methods, e.g.* *1.85 × 3 (portions) ≈ 6 (g)* *AND 11.7 × 8 (portions) ≈ 90 (g)*	*B3*	*Allow approximately or similar words for '≈'* *B2 for evidence of, e.g.* *1.85 × 3(portions) ≈ 6(g)* ***and*** *11.7 × 8(portions) ≈ 90(g)* *OR* *B1 for evidence of, e.g.* *1.85 × 3 (portions) ≈ 6 (g)* ***or*** *11.7 × 8 (portions) ≈ 90 (g)*
2(c) Alternative method 2: *Full method with one calculated proportion, compared with same proportion of the other ingredient, e.g.* • *31% salt with 0.31 × 90* • *13% sugar with 0.13 × 6* *Conclusion SALT and an accurate calculation of comparison, e.g.* • *27.9 (g) (sugar which is > 11.7 g in a portion)* • *0.78 (g) (salt which is < 1.85 g in a portion)*	*B1* *B2*	 *Ignore any units given and any additional statements if SALT unambiguously concluded with appropriate calculations evaluated correctly* *B1 for appropriate calculations evaluated correctly, with no or incorrect conclusion*

3(a) (Number of units is) 800	B1	
(Electricity cost is) 800 × 0.23 or 800 × 23	M1	FT 'their 20950 – 20150', must be from attempting this subtraction
(£)184 or 18400(p)	A1	If units are given they must be correct Accept £184.00p, do not accept £184p
(Standing charge + electricity) (£) 208 or 20800(p)	B1	FT 24 + 'their 184' provided units are consistent May be in implied or embedded in further work, e.g. if 184 × 1.05 + 24 seen and calculated correctly to (£)217.2(0)
(Total bill including VAT at 5%) 1.05 × 208 or 1.05 × 20800 or equivalent	M1	FT 'their (£)208' or 'their 20800(p)', including if the standing charge is omitted (i.e. (£)184 used) Allow if standing charge is added after adding VAT to the electricity cost
(£)218.4(0) or 21840(p)	A1	CAO
(Budget per month £218.40 ÷ 3 =) (£)72.8(0) or 7280(p)	B1	FT 'their total bill' ÷ 3 provided at least 2 marks previously awarded Allow rounded up to the nearest £ On FT allow rounding to 10p, or rounding up to the nearest £ (Note: FT answers from • one month standing charge (£)201.6(0))÷ 3 = (£)67.2(0) • standing charge omitted (£)193.2(0))÷ 3 = (£)64.4(0))
3(a) Alternative method:		*Watch for stages in other orders, check for embedded equivalent stages*
(Number of units is) 800	*B1*	
(Electricity cost is) 800 × 0.23 or 800 × 23	*M1*	*FT 'their 20950 – 20150', must be from attempting this subtraction*
(£)184 or 18400(p)	*A1*	*If units are given they must be correct* *Accept £184.00p, do not accept £184p*
(Budget before VAT 184÷3 + 24÷3 =) (£) 69.33(3..)	*B1*	*FT 'their 184'+ 8 provided units are consistent* *May be implied or embedded in further work, e.g. if (184÷3)×1.05 + 8 seen and calculated correctly to (£)72.4(0)*
(Total bill including VAT at 5%) *1.05 × (184 ÷ 3 + 24 ÷ 3) or equivalent*	*M2*	*FT 'their 184 ÷ 3 + 24 ÷ 3'* *M1 for either of the following:* • *1.05 × 'their 184 ÷ 3'* *(no standing charge included)* • *1.05 × 'their 184 ÷ 3' + 8* *(no VAT on standing charge)*
(Budget per month) (£)72.8(0) or 7280(p)	*A1*	*FT from M2 or M1* *Allow rounded up to the nearest £* *On FT allow rounding to 10p, or rounding up to the nearest £*

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.
3(b) $500 \times 1.022^5 \times 1.016^{15}$ $(500 \times 1.022^5 = 557.473...)$ $(500 \times 1.016^{15} = 634.418...$ or $634.42)$	M3	OR equivalent method to increase by 2.2% and to increase by 1.6% on different amounts for appropriate number of years M2 for sight of either $\times 1.022^5$ or $\times 1.016^{15}$ or equivalent calculations OR M1 for sight of either $\times 1.022$ or $\times 1.016$ or equivalent calculations
(£) 707.34	A1	Mark final answer, CAO, accepting answers in the range (£) 707.33 to (£) 707.35 (Note: Sight of (£)511 or (£)555 implies 500×1.022, from working with 2.2% of £500, M1 is awarded)
4(a)(i) $(Support1^2 =) 0.9^2 + 1.1^2$ $Support1^2 = 2.02$ or $(Support1 =) \sqrt{2.02}$ (Support 1 =) 1.4(2... m)	 M1 A1 A1	*Scale drawings are not accepted* Do not accept rounded to 2, unless final answer is 1.42(1... m)** FT from M1 for the correctly evaluated square root of 'their 2.02' provided 'their answer' > 1.1 (m) ***Note, award as follows:* *$(Support1^2 =) 0.9^2 + 1.1^2$ M1* *$Support1^2 = 2$ or $(Support1 =) \sqrt{2}$ A0* *(Support 1 =) 1.4(1... m) A1 FT* *$(Support1^2 =) 0.9^2 + 1.1^2$ M1* *$Support1^2 = 2$ or $(Support1 =) \sqrt{2}$ Allow A1 if ...* *(Support 1 =) 1.42(... m) A1 FT*
4(a)(ii) sin base angle = $\frac{1.1 + 0.8}{2.6}$ $\sin^{-1} \frac{1.1 + 0.8}{2.6}$ or $\sin^{-1} 0.73(0769....)$ (Base angle =) 46.95(...°) or 47(°)	M1 m1 A1	OR alternative full method using Pythagoras' theorem then cos or tan OR FT correct statement for 'their inverse trig ratio' Allow 46.88(...°) or 46.9(°) ISW unless subtracted from 90° If no marks, award SC1 for an answer of 50.7(°) or 51(°) from working with Support 1

4(b) (Discount cost of bricks) (516 – 8 × 22.5(0) =) (£) 336 100 × 336 ÷ 80 or 100 × $\frac{336}{80}$ (£) 420	B1 M1 A1	 FT 'their 516 – 8 × 22.5(0)' provided ≠ 516 and ≠ 180 for M1 and possible A1 If no marks, award SC2 for (516 ÷ 0.8 - 180 =) (£) 465 OR SC1 for (516 ÷ 0.8 =) (£) 645 or (100 × 180 ÷ 80 =) (£) 225
5(a)(i) $1800 \leq x < 2000$	B1	Accept '(£)1800 to (£)2000', or '(£)1800 – (£)2000'
5(a)(ii) Reason based on agreement due to the 4 people earning £5800 to £7800 per month or the majority of lower wages, e.g. 'the data is skewed', 'only a few of the employees will earn more than the mean wage', 'because most people employed are in the lowest 2 groups of the monthly wage' 'as the majority earn between 1800 and 2100'	E1	Allow, e.g. 'because there is a great difference between the monthly wages', 'the big numbers would affect the mean', 'more than half are in the first group' Do not accept, e.g. 'she doesn't know the exact values', 'using the median would be better', 'because there are no employees that have between 2400 and 5800 monthly wage', 'there are 64 in the first group'
5(b)(i) (2200, 48) joined to (2400, 72) joined to (3000, 80)	B2	Joined with a curve or a straight line B1 for a cumulative graph with either of the following: • correct plots but not joined, • 'their 2 plots' joined provided 1 plot 'correct' including FT plot at (3000, $48 < y \leq 80$)
5(b)(ii) £2160	B1	
5(b)(iii) 22.5(%) OR answer from correct working in the range 21(.25%) to 23.75(%) or 24(%)	B2	Working $\frac{17}{80} \times 100$ to $\frac{19}{80} \times 100$ B1 for sight of $\frac{17}{80}$ to $\frac{19}{80}$

6. Morgannwg bank $1.0041^{12} - 1$ OR $\left(1 + \frac{0.0492}{12}\right)^{12} - 1$ = 0.0503(…) or 5.03(…)% Banc Gwynedd $\left(1 + \frac{0.0492}{4}\right)^{4} - 1$ = 0.0501(…) or 5.01(…)% (Answer =) 0.02%	M1 A1 M1 A1 B1	 Do not accept 0.0503(…) % unless corrected in further work Do not accept 0.0501(…) % unless corrected in further work FT 'their 0.0503(…) or 5.03(…)%' AND FT 'their 0.0501(…) or 5.01(…)%' provided at least one M1 mark awarded and final answer written correct to 2 d.p
Alternative method: *Amount × 1.0041¹²* – *amount* × $\left(1 + \frac{0.0492}{4}\right)^{4}$ *= correct difference* $\frac{\text{difference}}{\text{amount}}$ *(× 100)* *= 0.02%*	*M2* *A1* *M1* *A1*	*M1 for a subtraction with 1 correct product* *From M2 only* *FT 'their values' provided at least M1 previously awarded* *Needs to be correct to 2 d.p. on FT*
7(a) Frequency density	B1	
7(b) 'No' OR 'You cannot tell' AND e.g. 'The heaviest player could have been 140 kg and the lightest player could have been 70 kg, but we cannot tell', 'It doesn't give you the mass of any player', 'You cannot tell exact weights because it is grouped data' OR No AND e.g. 'The lightest and heaviest players could not be 70kg and 140kg because of how groups are written'	E1	Do not accept reasons e.g. 'Because it is grouped data' without further explanation about how the data could be distributed in the groups, or 'The graph is not accurate enough'
7(c) 10×0.8 + 10×1.1 + 20×0.1 = 21	M1 A2	Allow for x×0.8 + 10×1.1 + 20×0.1, where $6 \leq x < 10$ May be seen on the diagram CAO A1 for 17.8, possibly rounded to 17 or 18 If no marks, SC1 for sight of 10×1.1 + 20×0.1, or 11 + 2, or 13 May be seen on the diagram

7(d) (Mid-points) 80, 95, 105, 115, 130 (Frequencies of) 8, 5, 8, 11, 2	B1 B1	May be seen on the graph May be seen on the graph or in (c) FT 'their 8, 11, 2' from (c)
$80\times8 + 95\times5 + 105\times8 + 115\times11 + 130\times2$ or equivalent $(640 + 475 + 840 + 1265 + 260 = 3480)$	M1	FT their frequencies (but not use of frequency densities 0.4, 0.5, 0.8, 1.1 and 0.1) AND FT their mid-points provided they are within the groups (inclusive of the boundaries)
$\div 34$	m1	Allow FT for the sum of their frequencies
$= 102.3(529\ldots)$ or 102.4	A1	CAO Allow an answer of 102 from correct working
8(a) (radius =) $15 \times 33 \div (22 + 33)$ or $15 \times {}^{3}/_{5}$ $(= 9)$ or equivalent	B2	Working MUST be shown here May be seen with appropriate tangent ratios If Pythagoras used, appropriate use of the scale factor would be needed Allow B1 for sight of ${}^{33}/_{55}$ or equivalent OR ${}^{55}/_{33}$ or equivalent
Sight of $1/3\times\pi\times15^2\times55$ OR $1/3\times\pi\times9^2\times33$	B1	(12952 to 12961 OR 2797.7 to 2800)
$1/3\times\pi\times15^2\times55 - 1/3\times\pi\times9^2\times33$ $= 4125\pi - 891\pi$ $(= 3234\pi$ $(cm^3))$	M1 A1	Accept values in the range 10154.7 to 10161.2 (cm^3)

8(b) (Scale factor =) $\frac{28.6}{22}$ (=1.3) OR $\frac{22}{28.6}$ (=0.769…)	B1	
(Volume factor =) $(28.6/22)^3$ or 1.3^3 OR $(22/28.6)^3$ or $0.769…^3$	B1	Or 2.197 Or 0.455…
3234π × $(28.6/22)^3$ or ÷ $(22/28.6)^3$ OR $\frac{3234\pi}{8 \times 1000} \times 1.75$	M1	Accept numerical values for 3234π (10154.7 to 10161.2) Allow use of the conversion 1 litre = 1.75 to 1.76 pints
= 22309 to 22324.3 (or 7105(.098)π to 7105.1π) OR = 2.22 to 2.26 (or 0.707π to 0.719π)	A1	
$\frac{\times 1.75}{8 \times 1000}$ OR × $(28.6/22)^3$ or ÷ $(22/28.6)^3$	M1	Allow use of the conversion 1 litre = 1.75 to 1.76 pints FT 'their derived 22309 to 22324.3' OR FT 'their 2.2(2…)' from use of 3234π
= 4.8(8…) to 4.96(…) (gallons)	A1	Allow an answer of 5 (gallons) from correct working Allow 1.55π to 1.58π (gallons). Do not accept 1.6π Allow the conversion into gallons for the M1 mark from any of the following also 1 pint = 567 to 570 ml ÷ 8 ÷ (567 to 570) 1 gallon = 4.5 to 4.55 litres ÷ 1000 ÷ (4.5 to 4.55) 1 litre = 0.219 to 0.22 gallons ÷ 1000 × (0.219 to 0.22)
Alternative method: *(Scale factor =)* $\frac{28.6}{22}$ *(=1.3)*	*B1*	
Dimensions of 19.5, 71.5, 11.7, 42.9	*B1*	*Allow B1 for any 3 correct dimensions*
$1/3\times\pi\times19.5^2\times71.5 - 1/3\times\pi\times11.7^2\times42.9$	*M1*	*(28456 to 28475) – (6146 to 6151)*
= 22 309 to 22 324.3 (cm^3)	*A1*	*Or 7105(.098)π to 7105.1π*
(22 309 to 22 324.3) $\frac{\times 1.75}{8 \times 1000}$	*M1*	Allow use of the conversion 1 litre = 1.75 to 1.76 pints *FT 'their derived 22309 to 22324.3'*
= 4.8(8…) to 4.96(…) (gallons)	*A1*	*Allow an answer of 5 (gallons) from correct working* *Allow 1.55π to 1.58π (gallons). Do not accept 1.6π* *Allow the conversion into gallons for the M1 mark from any of the following also* *1 pint = 567 to 570 ml ÷ 8 ÷ (567 to 570)* *1 gallon = 4.5 to 4.55 litres ÷ 1000 ÷ (4.5 to 4.55)* *1 litre = 0.219 to 0.22 gallons ÷ 1000 × (0.219 to 0.22)*

9. Use of cosine rule followed by sine rule Distance of Alpha from Aberwyn (distance =) $\sqrt{5.5^2 + 2.4^2 - 2 \times 5.5 \times 2.4 \times \cos 76(^\circ)}$ or (dist =) $\sqrt{}$29.623… (distance =) 5.4(427…) (km) Distance of Beta from Aberwyn (distance =) $\frac{5.4(427\ldots)}{\sin 118(^\circ)} \times \sin 32(^\circ)$ = 3.2(4…) to 3.3 (km)	S1 M2 A1 M2 A1	 M1 for (distance^2 =) $5.5^2 + 2.4^2 - 2\times5.5\times2.4\times\cos76(^\circ)$ or (dist^2 =) 29.623… CAO FT 'their derived 5.4(427…)' M1 for $\frac{\text{distance}}{\sin32(^\circ)} = \frac{5.4(427\ldots)}{\sin118(^\circ)}$ FT from M2 for their sine rule only
10(a) 0.035 × (250 000 – 180 000) + 0.05 × (255 000 – 250 000) (= 2450 + 250 = 2700)	B2	B1 for 0.035 × (250 000 – 180 000) (= 2450) OR B1 for 0.05 × (255 000 – 250 000) (= 250)

10(b) Sight of 0.05 × (x – 250 000) = 0.05x – 12 500	B1 B1	May be embedded in their equation May be embedded in their equation
		<u>No further marks unless an appropriate equation seen</u>
x + 2450 + 0.05x – 12 500 = 327 000 or equivalent	M1	FT 'their 0.035(250 000 – 180 000)' AND 'their 0.05 × 250 000'
1.05x – 10 050 = 327 000 OR 1.05x = 337 050	m1	
x = (£)321 000	A1	CAO
		If no marks awarded, award SC2 for x = (£)321 000 If B1 only previously awarded, replace with SC2 for x = (£)321 000
		Note: If a candidate uses x as being the amount over £250 000, then award B0B0 followed by M1 for 1.05x + 180 000 + (1.035 x 70 000) = 327 000 or equivalent A1 for x = (£) 71 000 A1 for (£) 321 000
Alternative method: *Sight of 0.05 × (x – 255 000)* *= 0.05x – 12 750*	*B1* *B1*	*May be embedded in their equation* *May be embedded in their equation*
		<u>No further marks unless an appropriate equation seen</u>
x + 2700 + 0.05x – 12 750 = 327 000	*M1*	*FT 'their 2700' AND 'their 0.05 × 255 000'*
1.05x – 10 050 = 327 000 OR 1.05x = 337 050	*m1*	
x = (£)321 000	*A1*	*CAO*
		If no marks awarded, award *SC2 for x = (£)321 000* *If B1 only previously awarded, replace with* *SC2 for x = (£)321 000*
		Note: If a candidate uses x as being the amount over £255 000, then award B0B0 followed by *M1 for 1.05x + 180 000 + 75 000 + 2700 = 327 000* *A1 for x = (£) 66 000* *A1 for (£) 321 000*