



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 ' $\div$ ' 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 $3.5 \div 14.5$ or $14 \div 58$ or $7 \div 29$
1(b) Sight of $\frac{2}{14.5} (\times 100)$ or $\frac{8}{58} (\times 100)$ 13.79(...%) or 13.8(%) or 14(%)	M1 A1	FT 'their 14.5' or 'their 58' from (a)(ii) provided $\neq 90$ 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) $140(^{\circ}) \pm 2(^{\circ})$ $\frac{140 \pm 2}{360} \times 90$ or $(140 \pm 2) \times 90 \div 360$ or $(140 \pm 2) \div 360/90$ 35 (pairs) (Arthur Avenue $4 \times 4 =$) 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' $\neq 90$ and $\neq 140 \pm 2$, and 'their Arthur Avenue total' $\neq 4$

2(a) Method to compare, e.g. (Per kg price in SuperM) $1000 \times 27 \div 450$ (1g cost of each, SuperM and FairMart) $27 \div 450$ and $57 \div 1000$ (g per penny for SuperM and FairMart) $450 \div 27$ and $1000 \div 57$ (450g at Fairmart) $57 \times 450 \div 1000$ (SuperM) $11 \times 450(\text{g})$ with $11 \times 27(\text{p})$ AND (Fairmart) $5 \times 1000(\text{g})$ with $5 \times 57(\text{p})$ 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	M1 A1 E1 OC1 W1	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 $(1000 \div 450 =) 2.222....$ to 1 or more decimal places to give 59.4, 59.94, 59.994, etc when $\times 27(\text{p})$ Accept comparison given in pence <table><tr><td></td><td>1 g</td><td>50g</td><td>450g</td><td>1kg</td><td>9kg</td></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><td></td><td>Per 1 p</td><td>Per £1</td></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.		1 g	50g	450g	1kg	9kg	SuperM	0.06 p	3 p	27 p	60 p	£5.40	FairMart	0.057 p	2.85 p	25.65 p	57 p	£5.13		Per 1 p	Per £1	SuperM	16.66.. g	1666.66..g	FairMart	17.54..g	1754.36..g
	1 g	50g	450g	1kg	9kg																								
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FairMart	17.54..g	1754.36..g																											
2(b) (Carrots) 2812.5 (g) (Stock) 5 (litres) (Cream) 25 (tablespoons) (Onions) 12 or 13	B2 B1	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																											

3(a)(i)18:30, Saturday	B1											
3(a)(ii)16:00, Saturday	B1											
3(b) 320 ÷ 0.61 or 524(.59...)525 (AUD)	M1A1											
4(a) 3.25 + 4× 2.4(0)(=) (£)12.85	M1A1	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>	Answer	From	(£)10.45	3.25 + 3×2.40	(£)11.97 (not for (£)11.96)	3.25 + 3(38/60) × 2.40	(£)17.4(0)	3.25 + 4 × 2.40 and incorrect BIDMAS	(£)22.6(0)	3.25 + 2.40 × 4 and incorrect BIDMAS
Answer	From											
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(£)22.6(0)	3.25 + 2.40 × 4 and incorrect BIDMAS											
4(b) (Minimum time) 61 minutes	B3	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										
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'	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'										
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'	E1	Do not accept, e.g. 'they may not remember', 'they don't know', 'they might not go swimming'										

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 $9.9 \text{ (m)} \leq x < 10 \text{ (m)}$ and $99.9 \text{ (m)} \leq y < 100 \text{ (m)}$ 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 $(9.95 + 9.95 + 99.5 =) 119.4 \text{ (m)}$
6(c) Alternative method: $100 + 10 + 10 - 3 \times 0.05$ 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) $9.3 \times 4.2 \div 3.6$ or $1.16666... \times 9.3$ or $9.3 \div (3.6 \div 4.2)$ or equivalent 10.85 (cm)		M1 A1	Allow M1 for 1.16×9.3 or 1.17×9.3 or $9.3 \div 0.85(7...)$ Allow answers in the inclusive range 10.78 (cm) to 10.95 (cm)

8(a) (Number of units is) 800 (Electricity cost is) 800×0.23 or 800×23 (£)184 or 18400(p) (Standing charge + electricity) (£) 208 or 20800(p) (Total bill including VAT at 5%) 1.05×208 or 1.05×20800 or equivalent (£)218.4(0) or 21840(p) (Budget per month $\pounds 218.40 \div 3 =$) (£)72.8(0) or 7280(p)	B1 M1 A1 B1 M1 A1 B1	FT 'their 20950 – 20150', must be from attempting this subtraction If units are given they must be correct Accept £184.00p, do not accept £184p FT 24 + 'their 184' provided units are consistent May be implied or embedded in further work, e.g. if $184 \times 1.05 + 24$ seen and calculated correctly to (£)217.2(0) 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 CAO FT 'their total bill' $\div 3$ 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 $(\pounds 201.6(0)) \div 3 = (\pounds)67.2(0)$ - standing charge omitted $(\pounds 193.2(0)) \div 3 = (\pounds)64.4(0)$
8(a) <i>Alternative method:</i> (Number of units is) 800 (Electricity cost is) 800×0.23 or 800×23 (£)184 or 18400(p) (Budget before VAT $184 \div 3 + 24 \div 3 =$) (£) 69.33(3..) (Total bill including VAT at 5%) $1.05 \times (184 \div 3 + 24 \div 3)$ or equivalent (Budget per month) (£)72.8(0) or 7280(p)	B1 M1 A1 B1 M2 A1	<i>Watch for stages in other orders, check for embedded equivalent stages</i> FT 'their 20950 – 20150', must be from attempting this subtraction If units are given they must be correct Accept £184.00p, do not accept £184p FT 'their 184' + 8 provided units are consistent May be implied or embedded in further work, e.g. if $(184 \div 3) \times 1.05 + 8$ seen and calculated correctly to (£)72.4(0) FT 'their $184 \div 3 + 24 \div 3$' M1 for either of the following: $1.05 \times \text{'their } 184 \div 3 \text{'}$ (no standing charge included) $1.05 \times \text{'their } 184 \div 3 \text{' } + 8$ (no VAT on standing charge) 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) $500 \times 1.022^5 \times 1.016^{15}$ $(500 \times 1.022^5 = 557.473\dots)$ $(500 \times 1.016^{15} = 634.418\dots \text{ or } 634.42)$ (£) 707.34	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 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)												
9(a)(i) (Support1² =) $0.9^2 + 1.1^2$ Support1² = 2.02 or (Support1 =) $\sqrt{2.02}$ (Support 1 =) 1.4(2... m)	M1 A1 A1 <i>Scale drawings are not accepted</i> 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: <table> <tr> <td>(Support1² =) $0.9^2 + 1.1^2$</td> <td>M1</td> </tr> <tr> <td>Support1² = 2 or (Support1 =) $\sqrt{2}$</td> <td>A0</td> </tr> <tr> <td>(Support 1 =) 1.4(1... m)</td> <td>A1 FT</td> </tr> </table> <table> <tr> <td>(Support1² =) $0.9^2 + 1.1^2$</td> <td>M1</td> </tr> <tr> <td>Support1² = 2 or (Support1 =) $\sqrt{2}$</td> <td>Allow A1 if ...</td> </tr> <tr> <td>(Support 1 =) 1.42(1... m)</td> <td>A1 FT</td> </tr> </table>	(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(1... m)	A1 FT
(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(1... m)	A1 FT												
9(a)(ii) $\sin \text{ base angle} = \frac{1.1 + 0.8}{2.6}$ $\sin^{-1} \frac{1.1 + 0.8}{2.6}$ or $\sin^{-1} 0.73(0769\dots)$ (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 $\frac{19}{80}$