GCSE MARKING SCHEME

SUMMER 2018

GCSE (NEW)
MATHEMATICS - NUMERACY
UNIT 2 - INTERMEDIATE TIER
3310U40-1

INTRODUCTION

This marking scheme was used by WJEC for the 2018 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 2018 MARK SCHEME

GCSE Mathematics – Numeracy Unit 2: Intermediate Tier Summer 2018	**Mark**	**Comment**
1(a) 180	B1	
1(b) Angle measured 135° ± 2° $\frac{2}{5}$ × 135° = 54(°)	B1 M1 A1	 FT for angles other than135° ± 2° provided < 360° Accept angles in the range 53(°) to 55(°)
1(c) 720 - 0.45×720 or 0.55 × 720 396 (males)	M1 A1	For complete method If no marks, award SC1 for sight of 324 (females)
2(a) (Fresh water charge £) 25.25 × 1.08 (= 27.27) (Waste water charge £) 22.31 × 1.70 (=37.927) (Total bill £27.27 + £37.927 = £) 65.19(7) or 65.2(0) **Undercharged** (by) (£)6.4(0) or (£)6.39(7) Organisation and communication Writing	M1 M1 A1 B1 OC1 W1	 CAO Must state under charged and the amount, however accept –(£)6.4(0) or –(£)6.39(7) FT difference between 'their derived total' and £58.80 with appropriate conclusion, over or under charged 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.

2(b)(i) 25.25 × 220 5555 (gallons)	M1 A1	 Mark final answer If no marks SC1 for either (47.56 × 220 =) 10463(.2 gallons), or (22.31 × 220 =) 4908(.2 gallons)
2(b)(ii) Suitable reason, e.g. 'as the conversion was only approximate', 'the **gallons** could have been rounded up or down', 'because it is to the nearest gallon'	E1	Accept 'I rounded my answer' following (b)(i) having been rounded, otherwise do not accept, e.g. 'Miss Price's bill may have been rounded up or down' Do not accept, e.g. 'she could have used less or more', 'she did not use an exact number of gallons' (as this repeats the question), 'she rounded up the amount of fresh water used', 'it is based on an estimate of how much fresh water is used and how much waste water is produced', 'it is likely she used just over or under a certain number of gallons', 'because it is an estimate'
3. (Cost of 1 apple 78 ÷ 3 =) 26(p)	B1	Accept 0.26p only if used correctly in further working
(Cost of 1 pear =) (1(.)22 – 26) ÷ 3 (=) 32(p)	M1 A1	Allow intention to divide by 3 FT 'their 26' provided evidence of 78 ÷ 3 Algebraic notation is not required Allow inconsistent place value for M1 only, unless corrected later, i.e. 3 pears + 26 = 1.22 or 3 pears = 1.22 – 26
(Cost of 5 pears + 2 apples =) 5 × (0.)32 + 2 × (0.)26 or 1(.)60 + (0.)52) (=) (£)2.12 or 212(p)	M1 A1	FT 5× 'their (0.)32' + 2 × 'their (0.)26' Allow inconsistent place value for M1 only, unless corrected later If units are given they must be correct
(Change £5 – 2.12 =) (£)2.88	B1	FT provided at least 3 previous marks are awarded Do not penalise incorrect units if already penalised, otherwise penalise incorrect units -1

4(a) 48 cm	B1	
4(b) 1:15 p.m. and 1:30 p.m	B1	
4(c) Suitable explanation, e.g. 'water level drops', 'depth of the water falls', ‘depth is decreasing (during low tide)’, ‘depth of water is decreasing’, ‘water level decreased at night’, ‘tide goes down’	E1	Ignore any additional comments or values Must refer to 'water' or ‘depth’ Allow, e.g. ‘when the water starts to run shallower’ Do not accept, e.g. 'negative gradient', 'goes down', ‘decrease going into the evening’, ‘depth of river is lower at this time’, ‘when the water starts to run shallow’, ‘river is dropping’, 'it drops', ‘it is decreasing’, **‘it** goes down’
4(d) 1 hour	B1	

5(a) 24.25 suitcase symbols 9700 ÷ 24.25 (Represents) 400 (people)	B1 M1 A1	 FT 'their 24.25' provided ≥ 23 Allow M1 for sight of any one of • *422 × 23 = 9706* • *404 × 24 = 9696* • *388 × 25 = 9700* 24.25 ÷ 9700 is M0, unless 400 seen FT provided 'their 400' is rounded to a whole number of people Do not allow an embedded answer with a multiplication *Unsupported 400 (people) is awarded all 3 marks* *(Note:* *9700 ÷ 23 gives 421 or 422 people* *9700 ÷ 23.25 gives 417 or 418 people* *9700 ÷ 23.75 gives 408 or 409 people* *9700 ÷ 24 gives 404 or 405 people* *9700 ÷ 25 gives 388 people* *9700 ÷ 26 gives 373 or 374 people* *9700 ÷ 27 gives 359 or 360 people* *9700 ÷ 28 gives 346 or 347 people* *9700 ÷ 29 gives 334 or 335 people* *9700 ÷ 30 gives 323 or 324 people)*
5(b) 3 : 2	B1	
5(c) Italy	B1	
5(d) 590 × 0.6(0) ÷ 1.18 or equivalent (£) 300	M3 A1	Ignore any additional incorrect calculations for M2 or M1 M2 for 590 × 0.6(0) (= 354) or equivalent, or M1 for 590 ÷ 1.18 (= 500) OR M1 for 590 – 'their 40% of 590' AND M1 for 'their 60%' ÷ 1.18 CAO. Accept an embedded answer, 300 ×1.18 = 354 An answer of (£)200, from 590 × 0.4(0) ÷ 1.18 is awarded M1 (for 590 ÷ 1.18) and then SC1

6. Costs are (Helmet with discount £) 80 – 0.15 × 80 or 0.85 × 80 or equivalent	M1	(= £68) May be considered in stages
(Fuel, 1 month =£) 1.26 × 350 ÷ 20 or 0.06(3) × 350	M1	(=£22.05 or £21)
(Total of all costs 400 + 151.2(0) + 37 + 68 + 22.05 or 588.20 + 68 + 22.05)	M1	FT 'their £68' and 'their £22.05' (including use of £21)
(£)678.25	A1	CAO. OR from alternative method looking at months to save for each item sight of either 11 months and a further (£)18.25 to pay or 12 months and (£)41.75 left over (this method implies possible final m1 and/or A1)
(Need to save for) 678.25 ÷ 60 (months)	m1	Award of m1 may be implied by A1 rounded up number of complete months FT 'their £678.25' provided at least M1 previously awarded (£677.20 ÷ 60 leads to 11.2866....) Allow sight of repeated addition of £60, at least showing 11 lots of £60 (= £660) An answer of 11(.3… months) implies m1
12 (complete months)	A1	FT for 'their total cost' ÷ 60 with the answer rounded up to whole number of months provided at least M1 previously awarded

7(a) (Period of time is) 3 years 4 months or 40 months Use of an amount between £16.8 and £22 million inclusive *(£19.35 million being the mean of the values given in the question)* (Amount given to charity per month is) An amount between (£)16.8 and (£)22 million inclusive divided by (number of months) 40 From correct calculation, an answer in the range (£)0.4 to (£)0.55 **million** inclusive or (£)400 000 to (£)550 000 inclusive	 B1 M1 M1 A1	*No marks if no working shown* Accept 3 years 3 months 30 days or 3 years 3 months 29 days Ignore incorrect interpretation of 'million', including omission of 'million' Accept sight of an amount in this range used in any calculation FT from M1 FT 'their 40' provided it is within the inclusive range of 36 to 52 months Ignore incorrect interpretation of 'million', including omission of 'million' Do not accept omission of the word 'million' FT depends on M1, M1 previously awarded If working shown, this must be from correct calculation Ignore any additional rounding Accept a range given as an answer provided it falls within the answer range given Accept an answer rounded as an estimate, from working, provided it falls within the range given *(FT within the inclusive range of 36 to 52 months gives an answer in the inclusive range £0.32 to £0.62 million)*
7(b) Impact, e.g. 'more in September 2012 than in September 2014 as the number of 5p bags bought is falling over time', 'less given to good causes', 'decreases', 'less (given)'	E1	

8(a) (Rhodri's time is) 5.5/22 = 0.25 (hours) or 15 mins	M1 A1	 Use of 0.25 hours as 25 minutes is A0 otherwise if not used, ignore incorrect conversion to minutes
Megan's time is 0.25 (hrs) – 5 mins (10 minutes or $\frac{1}{6}$ hour or 0.166…hour)	M1	For the idea, irrespective of inconsistent units FT 'their 0.25 hours' or 'their 15 minutes', including use of 0.25 hours, e.g. as 25 minutes
(Megan's route is) 12 × 10 (÷ 60) = 2 (miles)	M1 A1	FT 'their time used', written in hours or minutes provided at least M1 previously awarded CAO No marks for an unsupported answer of 2 (miles)
8(b) 66 (km/h)	B1	
9(a)(i) (x^2 =) $3^2 + 12^2$ x^2 = 153 or (x =) √153 12.4 (cm)	M1 A1 A2	Or alternative full method Or accurate first stage of alternative full method Must be 3 s.f. A1 for sight of (x =) 12.40 or 12.3(69…cm), NOT for 12 (cm) FT from M1 for the correctly evaluated square root of 'their 153' provided 'their answer' > 12 (cm)
9(a)(ii) (y=) $\tan^{-1}3/12$ or $\tan^{-1}$ 0.25, or $\cos^{-1}$ 12/12.4 or $\cos^{-1}$ 0.967.. or $\cos^{-1}$ 0.97.., or $\sin^{-1}3/12.4$ or $\sin^{-1}0.24$…, (*y* =)14.(0...°) (which is < 15°)	M2 A1	FT 'their 12.4' provided > 12 (cm) M1 for tan*y* = 3/12 or cos*y* = 12/12.4 or sin*y* = 3/12.4 Accept 14.(59...°) from use of 12.4 cm
9(b) 12 × 4.5 ÷ 3 or 4.5/tan14(.0..°) 18(cm) or 18.0(… cm)	M1 A1	FT 'their angle y' ISW to calculate the hypotenuse
10(a) (2 ×) 65 × 5 650 (m^2)	M1 A1	
10(b) (Area of both ends) π×20^2 - π×15^2 or equivalent (=549.7.....) + 650 An answer in the range 1199 (m^2) to 1200 (m^2)	M2 m1 A1	(= 1256.(...) – 706.(...)) M1 for ½ × π × 20^2 - ½ × π × 15^2 or 2 × π × 20^2 - 2 × π × 15^2 FT adding 'their (a)' FT provided at least M1 previously awarded Accept 175π + 650 (m^2) FT from M2, m1 previously awarded
10(c) Area × (0.)20 ÷ 3 £80	M1 A1	FT 'their area' from 10(b) Must be correct to the nearest £ An answer of 8000 implies M1, A0

11. $C = \frac{300 \times (60 - 32)}{32 - 8}$ $= 350$ (litres) $T = \frac{350 + 300}{26}$ $= 25$ (minutes)	M2 A1 M1 A1	M1 for any 3 or 4 values substituted correctly CAO FT 'their derived 350' and 'their 300' (used as H) If no marks, award SC1 for all 5 of the following correctly matched, i.e. H = 300, M = 32, X = 60, Y = 8, F = 26
12(a) Midpoints 20.5, 21.5, 22.5, 23.5 Missing 10 days for $23 \leq t < 24$ $20.5\times4+21.5\times8+22.5\times8+23.5\times10$ (= 82 + 172 + 180 + 235 = 669) $\div 30$ 22.3(°C)	B1 B1 M1 m1 A1	 FT 'their 10' provided ≠0 Allow with incorrect midpoints provided each one is within the correct interval including 'bounds' FT 20 + 'their 10' Allow 22(°C) from correct working If no marks or first B1 only, award SC1 for an answer of 21.7 (°C) (from working with the 20 days given)
12(b) Suitable assumption stated, e.g. 'used the midpoints (to represent each group)', 'I used a value in each of the groups to represent the group', 'the temperature is between the 2 values each time'	E1	FT from 'their points' used in (a)
12(c) Suitable reason given, e.g. 'many of the temperatures were less than the midpoint of the group in which they were recorded', 'the temperatures were often towards the lower end of the groups'	E1	Do not accept e.g. 'mid points were used', 'Faryl used exact values', 'raw data was used by Faryl', 'Faryl found the actual mean' without further explanation