GCSE MARKING SCHEME

SUMMER 2018

GCSE (NEW)
MATHEMATICS – UNIT 1 (INTERMEDIATE TIER)
3300U30-1

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.
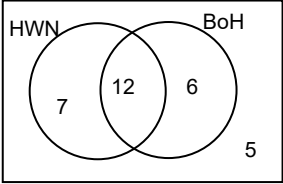
WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

WJEC GCSE MATHEMATICS (NEW)

SUMMER 2018 MARK SCHEME

GCSE Mathematics Unit 1: Intermediate Tier Summer 2018 Final Marking Scheme	Mark	Comments
1.(a) **Both** 13 AND 19	B2	Accept in any order. B1 for 17 AND 15. If B2 not awarded, B1 for any TWO of 11, 13, 17 and 19.
1.(b) 12	B2	B1 for 16 or 18 or 20. B1 for 12 AND any multiple of 12 (not in the list).
1.(c) 17	B1	
2.(a) 10 miles	B1	
2.(b) 1 kg	B1	
2.(c) 7 pints	B1	
3.(a) −5 −1 1	B2	B2 for all three correct. B1 for one or two correct.
3.(b) Correct plots. Straight line from (−4,−7) to (6,3)	P1 L1	FT 'their y-values at x = −2, 2 and 4'. 2 correct plots sufficient as they are told it's a straight line. Allow ±'½ a small square'. P0 if any incorrect plot. CAO no FT. Allow ±'1 small square'. Must be from (−4,−7) to (6,3) but allow 'extended' line. A correct line gains P1L1.
3.(c) (−4,−7) (6,−7) (6,3) (−4,3) (In any order)	B2	B2 for all four correct. B1 for three correct. *Only award B1(not B2) if <u>all four</u> correct coordinates given for their extended line.* If L0 from a 'shortened <u>correct</u> line' then _FT (for B2 or B1). If L0 from an incorrect line then FT (for B2 or B1) only if a quadrilateral has been **drawn using** 'their line' as a diagonal. SC1 for <u>the correct</u> square <u>drawn</u> but no (or incorrect) coordinates given.

4.(a) Statement indicating that 0·3 is less than 0·5.
  OR Statement indicating that probability of selecting a blue ball should be greater than 0·5.
  OR Statement that refers to a proportion of the balls e.g. '(Only) 30% (of the balls) are blue',
      '(Only) 3/10(ths) (of the balls) are blue'.
	E1	B0 for e.g. 'Fewer than half the balls are blue'.
		'Should be higher', 'Would be above 0·3'.
		
		Allow correct interpretation of 0·3 e.g.
		'(Only) 30 out of 100 are blue',
		'(Only) 15 out of 50 are blue'.
		
		Accept any indication for 0·5, e.g. 'half', '½'.

4.(b) 0·7 or equivalent.	B1	B0 for incorrect notation e.g. '7 out of 10'.
4.(c) 0·3 × 50 15	M1 A1	 If <u>no</u> marks gained, allow SC1 for sight of 15 e.g. '15/50', 15 : 35.
5.(a) Correct cuboid	B2	For B2, their cuboid must have edges along or parallel to the 3 directions usually associated with isometric paper (the two diagonals and the vertical). B1 for any one edge dealt with correctly for all its three occurrences <u>in a cuboid</u>. For any mark to be awarded the line must go 'through the dots' AND have both ends 'on a dot'. Ignore attempt at handling 'hidden lines'.

5.(b)   (Volume =) 6 × 4 × 3
                    = 72
                          cm³.
	M1
	A1
	U1
		Any further manipulation to 6 × 4 × 3 is M0.
		
		Independent of other marks.

6.(a)	$t_7 = t_6 + 3$	B1	
6.(b) (i)	9	B1	Mark final answer.
6.(b) (ii)	−5	B1	Mark final answer.
7.	50	B3	Award B1 for each of the 2nd, 3rd and 4th condition *1-20 gain B1 apart from,* B0 for 4,12,16,20. B2 for 2,18. *21-79 gain B2 apart from,* B1 for 24,28,36,40,44,48,52,56,60,64,68,76. B3 for 50. *80-100 gain B1 apart from,* B0 for 80,84,88,92,96,100. B2 for 98. Otherwise B0 if number greater than 100. B0 if not a whole number.
8. (EC = Side of the square =) $\dfrac{28}{4}$		M1	*Lengths may be seen on the diagram.*
= 7(cm)		A1	Any side of square shown as 7(cm) is M1A1.
(Area of triangle CDE =) $\dfrac{7 \times DE}{2}$ = 35(cm^2)		M1	FT 'their stated or shown length for EC'.
(DE =) 10(cm)		A1	
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 explanation and working in a way that is clear and logical
Accuracy of writing.		W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.
9.(a)	Correct reflection in y = 1.	B2	B1 for correct reflection in x = 1 OR B1 for sight of line y = 1
9.(b) <u>Clockwise</u> <u>rotation</u> of <u>90(°)</u> <u>about the origin.</u>		B3	For all **four** components. Accept anticlockwise rotation of 270° about the origin. B2 for any three. B1 for any two. 'Origin' may be stated as e.g. (0,0) or 0 or O. Do not accept 'turn' for rotation. Allow for 'about the origin' any reference to the origin. e.g. 'in the origin', 'around the origin', 'from (0,0)' etc. If not a single transformation (e.g. 'clockwise rotation of 90 and then …..) penalise −1 mark from any marks gained. (Above example gains B2 −1 = 1 mark.)
10.(a)	12	B1	
10.(b)	× 1·04^t	B1	
10.(c)	$3^1/_5$	B1	

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11.(a)			Any 'blank space' to be taken as 0. If 'notches/tallies' are used, penalise −1 once.
	12 AND 5 in correct position.	B1	B0 if any other number written in the same section.
	Total of 18 for '*Bread of Heaven*'	B1	Allow more than one number in the same section.
	Overall total of 30.	B1	Allow more than one number in the same section.
11.(b)	$\dfrac{19}{30}$ or equivalent. ISW	B2	B1 for a numerator of 19 <u>OR</u> FT 'their total for *HWN*' in a fraction < 1. B1 for a denominator of 30 <u>OR</u> FT 'their total' in a fraction < 1. An answer of 19/30 gains B2 regardless of 'their Venn diagram'. Penalise incorrect notation (e.g. '19 in 30') −1.
12.(a)	$5x^2 - 2x - 3x^2 + 6x - 21$	B2	B1 for sight of $5x^2 - 2x$. B1 for sight of $- 3x^2 + 6x - 21$. Brackets must be removed. Allow both of the above B marks even if not part of a single expression. *FT for B2 if at least two x^2 terms AND at least two x terms to be simplified.* *FT for B1 if at least two x^2 terms OR at least two x terms to be simplified.*
	$= 2x^2 + 4x - 21$	B2	If B2 not awarded, allow B1 for correct collection of 'x^2 terms' ($2x^2$) OR B1 for correct collection of 'x terms' (+4x). This 2nd B2 (or B1) is for their **final** answer. Any compensating errors leading to a 'correct' answer is B0. Penalise −1 for any attempt to equate their expression to zero (and attempting to solve) OR Incorrectly factorising.
12.(b)	$22 - f = 3 \times 6$ or equivalent. $22 - 18 = f$ OR $-f = 18 - 22$ $f = 4$	M1 A1 A1	C.A.O. Accept 4 = f. M1A1A0 for –f = −4. Mark final answer. Allow all 3 marks for $\dfrac{22 - 4}{3} = 6$ with <u>no</u> further work. Allow 2 marks for $\dfrac{22 - 4}{3} = 6$ followed by 'f ≠ 4. If no marks gained. Allow SC1 for an unsupported f = −4. Allow SC1 for sight of 18 from 3 × 6.
13.(a)	$1/6 \times 1/6$ $= 1/36$	M1 A1	
13(b)(i)	P(Caernarfon) = ¼ or equivalent P(Newtown) AND P(Ebbw Vale) $= 1/8$ or equivalent	B1 B1	*Penalise incorrect notation −1 once only in 13(b)* C.A.O. C.A.O. Do not allow 0·5/4 for 1/8.
13(b)(ii)	½ + 1/8 =5/8 or equivalent.	M1 A1	FT ½ + 'their P(Eb.V.)'. Provided P(Eb.V)<1 for M1. FT answer must be < 1 for A1. Allow 2·5/4 for 5/8 if answer to 13(b)(i) is 0·5/4.

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14.(a)	$1 \cdot 56 \times 10^6$	B2	Mark final answer. B1 for sight of $15 \cdot 6 \times 10^5$ OR $1\,560\,000$ OR equivalent correct value but not in standard form.
14.(b)	$1 \cdot 3 \times 10^5$	B2	Mark final answer. B1 for sight of 13×10^4 OR $130\,000$ OR equivalent correct value but not in standard form.
15.	$3x(4x + y)$	B2	Accept $3x(4x + 1y)$ B1 for $3x(4x \pm ....)$ or $3x(.....+ y)$ B1 for $3(4x^2 + xy)$ or $x(12x + 3y)$.
16.	$(ADC =)$ $109(°)$ $x = 180 - 26 - 109$ $= 45(°)$	B1 M1 A1	*Answers may be written on the diagram.* Allow for sight of $109(°)$. FT 'their $109°$' (may be clearly indicated on the diagram) <u>provided</u> $\neq 71$ and $\neq 26$. An answer of $45(°)$ gains all 3 marks.
17.	Correct construction of perpendicular bisector of line AB.	B2	*Allow ± 2° and ± 2 mm* B1 for a perpendicular bisector with no arcs or only one pair of intersecting arcs (above or below) shown. B1 for two pairs of correct arcs, with no line or an incorrect line.
	Correct construction of 60° at A.	B1	Must show relevant arcs.
	Arc of radius 6 cm, centre A.	B1	Must be of sufficient length so as not to be considered a 'point' or a 'notch'.
	Correct region identified.	B1	FT for similar viable region (*a straight line intersecting AB, an angle at point A and an arc with centre A*) even if no previous marks gained.
18.			*Angles shown on the diagram take precedence.* If any angle is not named then it must be unambiguously identified either on the diagram, from a given reason or in further work. (e.g. must be convincing that X = 80 is referring to BXC and not AXB.) If initial incorrect assumptions are made then allow correct FT methods to calculate other relevant angles.
	$\angle BXC = 80(°)$ Reason: 'BX = BC' OR 'Isosceles triangle'	B1	
	$\angle AXB (= 180 - 80) = 100(°)$ Reason: 'Angles on a straight line'.	B1	FT 180 – 'their $\angle BXC$'
	$\angle ABX (= 180 - 40 - 100) = 40(°)$ Reason: 'Angles in a triangle'.	B1	FT 180 – 40 − 'their $\angle AXB$'.
	Statement 'So AX = BX', Reason: 'Two equal angles (in a triangle)' OR $\angle ABX = \angle BAX$ OR 'Isosceles triangle'.	B1	Only available if $\angle ABX$ **<u>stated or shown</u>** to be $40(°)$
	Sight of at least TWO of the above reasons.	E1	Reasons must be appropriate AND are dependent on associated B1 gained.

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<u>*Alternative method 1.*</u> $\angle BXC = 80(°)$ *Reason: 'BX = BC' OR 'Isosceles triangle'.*	*B1*	
$\angle CBX (= 180 – 80 – 80) = 20(°)$ *Reason: 'Angles in a triangle'.*	*B1*	*FT 180 – 80 − 'their ∠BXC'.*
$\angle ABX (= 180 – 80 – 40 – 20) = 40(°)$ *Reason: 'Angles in a triangle'.*	*B1*	*FT 180 – 80 − 40 − 'their ∠CBX'.*
Statement 'So AX = BX'. *Reason: 'Two equal angles (in a triangle)' OR* *∠ABX = ∠BAX OR 'Isosceles triangle'.*	*B1*	*Only available if ∠ABX <u>**stated or shown**</u> to be 40(°)*
Sight of at least TWO of the above reasons.	*E1*	*Reasons must be appropriate AND are dependent on associated B1 gained.*
<u>*Alternative method 2. (Assumption that AX = BX).*</u> $\angle ABX = 40(°)$ *Reason: 'AX = BX' OR 'Isosceles triangle'.*	*B1*	
$\angle AXB (= 180 – 40 − 40) = 100(°)$ *Reason: 'Angles in a triangle'.*	*B1*	*FT 180 – 40 − 'their ∠ABX'.*
$\angle BXC = 80(°)$ *Reason: 'Angles on a straight line'.*	*B1*	*FT 180 − 'their ∠AXB'.*
Statement 'So BX = BC' (as given) *Reason: 'Two equal angles (in a triangle)' OR* *'∠BXC = ∠BCX' OR 'Isosceles triangle'.*	*B1*	*Only available if ∠BXC <u>**stated or shown**</u> to be 80(°)*
Sight of at least TWO of the above reasons.	*E1*	*Reasons must be appropriate AND are dependent on associated B1 gained.*
<u>*Alternative method 3. (Assumption that AX = BX).*</u> $\angle ABX = 40(°)$ *Reason: 'AX = BX' OR 'Isosceles triangle'.*	*B1*	
$\angle CBX (= 180 – 80 − 40− 40) = 20(°)$ *Reason: 'Angles in a triangle'.*	*B1*	*FT 180 – 80 – 40 − 'their ∠ABX'.*
$\angle BXC (= 180 – 80 – 20) = 80(°)$ *Reason: 'Angles in a triangle'.*	*B1*	*FT 180 – 80 − 'their ∠CBX'.*
Statement 'So BX = BC' (as given) *Reason: 'Two equal angles (in a triangle)' OR* *'∠BXC = ∠BCX' OR 'Isosceles triangle'.*	*B1*	*Only available if ∠BXC <u>**stated or shown**</u> to be 80(°)*
Sight of at least TWO of the above reasons.	*E1*	*Reasons must be appropriate AND are dependent on associated B1 gained.*