GCSE MARKING SCHEME

AUTUMN 2018

GCSE
MATHEMATICS
UNIT 2 - INTERMEDIATE TIER
3300U40-1

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.

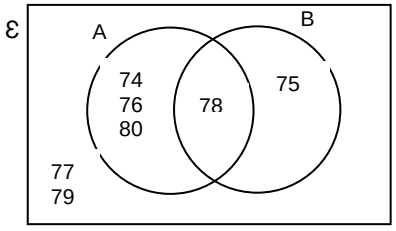
WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

WJEC GCSE MATHEMATICS (3300U40-1)

AUTUMN 2018 MARK SCHEME

GCSE Mathematics **Unit 2: Intermediate Tier**	**Mark**	**Comments**
1.(a) 71	B2	B1 for sight of 70·8(….) OR sight of 70 OR sight of 71·0… Mark final answer.
1.(b) 0·57 × 83·5 or equivalent. 47·6	M1 A2	A1 for sight of 47·5(….) or sight of 47·60. A1 for 47·6%. Mark final answer.
2. Circles TRUE Squares TRUE Triangles FALSE Rectangles FALSE Reg. Hexagons TRUE	B3	For all 5 correct B2 for 4 correct. B1 for 3 correct
3. Correct pie chart showing two sectors with angles 120° and 240°	B3	*Allow ± 2°.* *If B3 not gained.* *8/24 × 360 OR 16/24 × 360* *M1* *= 120(°) OR = 240(°)* *A1* *Correct drawing of 'their angle' F.T.* *A1* *(Possible M1A0A1 for incorrect calculation OR possible M1A1A0 for incorrect drawing)*
Correct labelling.	B1	For any diagram showing just two sectors with the largest sector labelled 'awake' and smallest sector labelled 'asleep'. Allow equivalent unambiguous labels or key BUT NOT just 120(°) and 240(°) or just 8(hr) and 16(hr)
4. A number 'n' is chosen. 0·25 × n (or equivalent) OR 0·2 × n (or equivalent)	M1	
÷ 5 (or equivalent) OR ÷ 4 (or equivalent)	m1	For an **appropriate** 2nd step.
= n/20 = n/20	A2	A1 for each correct value (C.A.O.). Dependent on both M1 and m1.
If no number 'n' chosen. • 1/5 of 25% = 5% AND 1/4 of 20% = 5% with no further incorrect work		Award SC4
• 1/5 of 25% = 5 AND 1/4 of 20% = 5 ISW		SC2
• 1/5 of 25% = 5% OR 1/4 of 20% = 5% ISW		SC1 No marks for showing just one of the following. 1/5 of 25% = 5 OR 1/4 of 20% = 5

5. (ABC or BAC =) $\frac{180 - 76}{2}$ = 52(°)	M1 A1	Angles may be shown on the diagram.
(CBP = 180 – 52 =) or (CBP = 76 + 52 =) 128(°)	B1	F.T. 'their derived, stated or shown 52' BUT not 76.
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
6.(a) (m =) 9·6	B1	Mark final answer. Allow embedded answer. B1 for 9·6/2 or 9·6/2 = 4·8 with no further work. B0 for 9·6/2 followed by 'm ≠ 9·6'.
6.(b)(i) 3(2x – 5)	B1	Allow 3 × (2x – 5)
6.(b)(ii) y(y + 4)	B1	Allow y × (y + 4)
6.(c)(i) −2	B1	B0 for −2n. Mark final answer.
6.(c)(ii) Example given, e.g. 3 × 25 – 20 = 55	B1	Candidates must show a calculation or link a term with its correct value e.g. '25th term is 55'. If they list the terms, then the list must be accurate and start at −2 (6th term) or one of the previous terms.
7. All possible numbers shown with no extras. (11,12,13,14,21,22,23,24,31,32,33,34,41,42,43,44) OR Clearly justifies that there are 16 possible numbers from 4 × 4 = 16	B2	B1 for at least 10 correct and no more than 4 'extras'. 10 + 1, 10 + 2, etc and not added gain no credit.
(Probability multiple of 7 =) $\frac{3}{16}$ or equivalent. ISW	B2	F.T. 'their list' only if at least 6 numbers given which includes at least one multiple of seven. OR B1 for x/16 with x<16. B1 for 3/y with y >3. Penalise, −1, any incorrect notation e.g. '3 out of 16'. Unsupported 3/16 gains B0B2.

8.(a) (1 mile =) 8/5(km) or 1600(m) or equivalent	B1	For sight of a correct conversion e.g. 5 miles = 8 km , 1 km = 5/8 mile. Allow more accurate correct approximations (for <u>all</u> marks) only if in the range [1609(m) to 1610(m)] . No FT from an incorrect conversion.
(Difference =) $\frac{8}{5} \times 1000 - 1{\cdot}5 \times 1000$	M1	Allow M1 for $\frac{8}{5} - 1{\cdot}5$ (= 0·1) or equivalent.
100 (metres)	A1	Allow –100 (metres). If no marks gained then allow SC1 for sight of (1·5 × 5/8)
8.(b) 4×100^2	M1	Also for alternative correct methods e.g. (A 4x1 rectangle followed by) a 400×100 calculation, 200 × 200, etc.
= 40000	A1	
9. (Area of square =) 40·96(cm^2)	B1	
(Perp. height of triangle =) 4·3(cm)	B1	May be seen on the diagram. Do not accept 4·3 as a 'slant height' <u>unless used correctly for M1.</u>
(Area of triangle =) $\frac{6{\cdot}4 \times 4{\cdot}3}{2}$	M1	F.T. 'their unambiguously stated 4·3'. (Not 10·7).
= 13·76(cm^2)	A1	
(Area of ABCDE = 40·96 + 13·76 =) 54·72(cm^2)	B1	F.T. from two derived or stated areas. Allow 54·7 only if 54·72 seen. *Otherwise penalise **pre**-approximation −1 once only.*
10.(a) $\times 0{\cdot}88^3$	B1	
10(b) $\frac{45{\cdot}9 - 42{\cdot}5}{42{\cdot}5}$ (= 0·08) OR $\frac{45{\cdot}9}{42{\cdot}5}$ (= 1·08)	M1	May be seen in parts.
0·08 × 100 OR (1·08 × 100) – 100	m1	
8(%)	A1	C.A.O. If no marks awarded allow SC1 for −8(%).
11.  	B2	Correct groupings of all 7 numbers within and outside the two circles (with or without a rectangle). B1 for 5 or 6 correctly placed numbers. No credit for a number shown in more than one section. Penalise −1, once only, if a number not in the universal set is noted. <u>Ignore labelling for this B2 or B1.</u> (i.e. ignore missing, conflicting or incorrect labels.)
	B1	*Allow intent of drawing circles and a rectangle.* Two intersecting circles correctly <u>labelled</u> A and B OR 'even numbers' and 'multiples of 3' (but not conflicting labels or labels that conflict number placements) <u>within a rectangle.</u> Allow missing 'ε' symbol.

12.(a) −5 11	B2	B1 for each. Table takes precedence if conflicting values given.
12.(b) At least 6 correct plots and no incorrect plot.	P1	F.T. 'their (−2,−5)' and 'their (2,11)' OR (−2,−5) and (2,11) plotted. Allow ± '½ a small square'. Ignore any plots that can not be shown e.g. (−2,−13).
A smooth curve drawn through their plots.	C1	F.T. 'their plots'. OR a curve through the 6 given points and (−2,–5) and (2,11). Allow intention to pass through their plots. (± 1 small square horizontal or vertical.)
12.(c) Line y = 2 drawn	L1	Must be at least 2cm long.
−4·65 AND 0·65	B1	F.T. intersection of 'their curve' with 'their y = 2' only if exactly two points of intersection. Allow ± '1 small square'.
13. 70	B3	B2 for 77 OR 80 B1 for any number between 65 and 79 inclusive, apart from 70(B3) and 77(B2) B1 for 56, 60 OR 63
14. One correct evaluation $5 \le x \le 6$ 2 correct evaluations $5{\cdot}55 \le x \le 5{\cdot}75$, one < 107, one > 107. 2 correct evaluations $5{\cdot}65 \le x \le 5{\cdot}75$, one < 107, one > 107. $x = 5{\cdot}7$	 B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if 'too high' or 'too low'. If evaluations not seen accept 'too high' or 'too low'.* x $x^3 - 13x$ (or check $x^3 - 13x - 107=0$) 5 60 5·1 66·351 5·2 73·008 5·3 79·977 5·4 87·264 5·5 94·875 **5·6 102·816** 5·55 98·803... **5·7 111·093** **5·65 106·912...** 5·8 119·712 5·655 107·326... 5·9 128·679 5·75 115·359... 6 138
15.(a) $\frac{1}{2}$	B1	
15.(b) −3	B1	
15.(c) (5, 2)	B1	
16. (Length of side = $\frac{76{\cdot}4}{4}$ =) 19·1(m)	 B1	
(diagonal^2 =) $19{\cdot}1^2 + 19{\cdot}1^2$ diagonal^2 = 729·6(2) or (diagonal =) $\sqrt{729{\cdot}6(2)}$ (diagonal =) 27·0(..)(m) or 27(m)	M1 A1 A1	F.T. 'their derived length of side' (not 76·4) Diagonal = 729·6(2) is A0 unless corrected in further work F.T. 'their 729.6' provided M1 awarded and their answer is greater than 19·1. Award SC2 for a final answer of 108(·0…)(m) (from using 76·4(m) as side length) BUT In this case there is no credit given for sight of 19·1.

17.(a) 0·92 written on the 'Not a Saturday' branch. Sight of 1 − 0·15 − 0·45 OR 0·4 or 0·40 0·4(0) <u>on</u> both 'car' branches AND 0·15 AND 0·45 correctly shown <u>on</u> lower branches.	B1 B1 B1	Allow this B1 if shown on working lines.
17.(b) Sight of 0·08 × 0·15 OR 0·08 × 0·4 or equivalent. (P(Sat and 'plane or car') =) 0·08 × 0·15 + 0·08 × 0·4 or equivalent = 0·044 or equivalent. ISW	 B1 M1 A1	 FT 'their P(car)' if <1. 0·08 × 0·55 implies previous B1.
<u>Alternative method</u> (P(Sat and 'plane or car') =) 1 – (0·92 + 0·08 × 0·45) or equivalent = 0·044 or equivalent. ISW	 M2 A1	 FT 'their 0·92'. M1 for intent P(Sat and 'plane or car') = 1 – P('not Saturday') – P('Saturday and train')
18.(a) Tan x = $\frac{6·4}{8·2}$ (x =) $\tan^{-1}$ 0·78(0..) or $\tan^{-1}\frac{6·4}{8·2}$ = 38(°) OR 37·9(...°)	M1 A1 A1	 Implies previous A1.
<u>Alternative method.</u> ***Correct** use of 'two-step' method.* *(x) = 38(°)*	 M2 A1	 *A partial trigonometric method is M0.* *Accept an answer that rounds to 38(°)*
18.(b) (PAQ = 90 – 38 =) 52(°) AQ = $\frac{7·9}{\sin 52(°)}$ (AQ) = 10(cm) OR 10·0(…cm)	B1 M2 A1	FT 90° − 'their 38°'. May be seen on the diagram. FT 'their clearly defined PAQ' BUT <u>not</u> if PAQ = 'their x'. M1 for sin52(°) = $\frac{7·9}{AQ}$
<u>Alternative method.</u> PQA =*38(°)* AQ = $\frac{7·9}{\cos 38(°)}$ (AQ) = 10(cm) OR 10·0(…cm)	 B1 M2 A1	 FT 'their 38°'. May be seen on the diagram. FT 'their clearly defined PQA' M1 for cos 38(°) = $\frac{7·9}{AQ}$
<u>Alternative method.</u> *(PAQ = 90 – 38 =) 52(°)* ***Correct** use of 'two-step' method.* *(AQ) = 10(cm)*	 *B1* *M2* *A1*	 *FT 90° − 'their 38°'.* *A partial trigonometric method is M0.* *FT 'their clearly defined PAQ'* *BUT <u>not</u> if PAQ = 'their x'.* *Accept an answer that rounds to 10(cm)*