GCSE MARKING SCHEME

AUTUMN 2016

MATHEMATICS (NEW)
UNIT 2 - INTERMEDIATE TIER

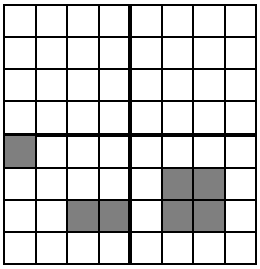
3300U40-1

INTRODUCTION

This marking scheme was used by WJEC for the 2016 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.

GCSE MATHEMATICS Unit 2 : Intermediate Tier Autumn 2016	✓	Mark	Comment
1.(a) 59 or 61		B1	Still only B1 if both given (with no incorrect value(s)). B0 if any incorrect value given.
1.(b) 64		B1	Do not accept 4^3 or 4×4×4 unless 64 also shown.
1.(c) 62		B1	Do not accept 186/3 unless 62 also shown.
1.(d) 58		B1	Do not accept 7·25×8 unless 58 also shown.
2.(a) 30°		B1	
2.(b) 110°		B1	
2.(c) 270°		B1	
3. 		B3	B1 for each individual shape. Penalise −1 if more than 7 squares are shaded. Ignore clearly deleted shading. .
4.(a) $3x = 12$ $x = 4$		B1 B1	F.T. from $3x = k$. x = 12/3 is B1B0 Allow an embedded answer. Mark final answer.
4.(b) (i) 21		B1	
4.(b) (ii) $7(n + 5)$ or $7\times(n + 5)$ or $(n + 5)7$ or $(n + 5) \times 7$ or $7n + 35$		B2	B1 for $n + 5 \times 7$ OR $7 \times n + 5$. B0 for unsupported $n + 35$ OR unsupported $7n + 5$. Mark final answer.
5. Up 4(°C) −1(°C) −4(°C)		 B1 B1 B1	 Allow +4 (but not 4) for this B1.
6. (Interior angle =) $55^{(o)}$ (x =) 360 – (117 + 74 + 55) $= 114^{(o)}$		B1 M1 A1	For sight of $55^{(o)}$. May be on diagram. F.T. 'their 55' but not 125°. <u>*Alternative method*</u> *(x=) 180-74-117+125 or equivalent* *M2* $= 114^{(o)}$ *A1*
7. e.g. 1·1 × 100 or equivalent. = 110 0·9 × 110 or equivalent. = 99 AND 'FALSE'	✓ ✓ ✓ ✓	M1 A1 M1 A1	Candidates may use any value or amount. F.T. 0·9 × 'their answer'. Accept any equivalent indication that statement is 'FALSE'. <u>*Alternative method*</u> *Sight of either 1·1 OR 0·9* *AND <u>used in a calculation</u>* *B1* *1·1 × 0·9* *M1* *= 0·99* *A1* *Convincing statement.* *A1*
8. FALSE TRUE TRUE FALSE		B2	B1 for 3 correct.

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9. (Diameter of circle =) 80 ÷4	✓	M1	
= 20(cm)	✓	A1	May be seen on the diagram as a side or a diameter. Radius (or '½ a side') =10; stated, used or seen on the diagram implies M1A1.
(Circumference =) π×20 or 2×π×10 or equivalent	✓	M1	F.T. 'their derived diameter (not 10 and not 80) or derived radius(not 20 and not 80).
= 62·8(cm)	✓	A1	Must be given to 1dp.
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.
10(a) $n + 2$		B2	B1 for sight of $n \pm k$ where $k \neq 0$. Allow the n to be shown as $1n$ or $n1$ or n^1 or 1×n. Penalise use of any other letter (apart from N) −1.
10.(b) (i) 8 11 16		B2	B1 for two correct OR for 7, 8, 11. OR for 11, 16, 23.
10.(b) (ii) 9(th term)		B2	B1 for sight of $n^2 > 78$ OR sight of 88 OR sight of $9^2 + 7$
11.(a) Correct reflection in $y = 2$		B2	B1 for a correct reflection in $x = 2$ OR B1 for sight of line $y = 2$.
11.(b) Anticlockwise rotation of 90° about the origin.		B3	For all **four** components. Accept clockwise rotation of 270° about the origin. B2 for any three. B1 for any two. Treat '¼ turn' as one component. 'Origin' may be stated as (0,0) or 0 or O. Allow e.g. 'in the origin', 'around the origin'.
11.(c) (i) Correct translation.		B1	
11.(c) (ii) $\begin{pmatrix} 5 \\ 4 \end{pmatrix}$		B1	B0 for 5 (missing brackets) OR (5,4) 4 B0 for $\frac{5}{4}$ with or without brackets.

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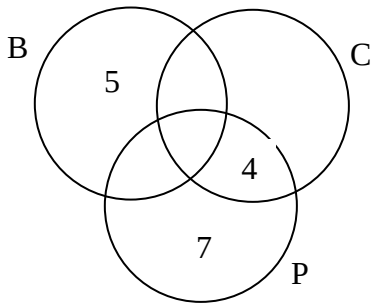
12. (a) x^9		B1	
12.(b) $4x - 7y$		B1	
12.(c) $2x$		B1	
13. One correct evaluation $2 \le x \le 3$ 2 correct evaluations $2{\cdot}15 \le x \le 2{\cdot}35$, (one value < 0, one value > 0.) 2 correct evaluations $2{\cdot}25 \le x \le 2{\cdot}35$, (one value < 0, one value > 0.) $x = 2{\cdot}3$	 ✓ ✓ ✓ ✓	 B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if negative or positive. If evaluations not seen accept 'too high' or 'too low'.* x $2x^3 - 3x - 17$ 2 −7 2·1 −4·778 2·2 −2·304 2·3 0·434 2·15 −3·573... 2·4 3·448 2·25 −0·968... 2·5 6·75 2·26 −0·693... 2·6 10·352 2·27 −0·415... 2·7 14·266 2·28 −0·135... 2·8 18·504 2·29 0·147... 2·9 23·078 2·35 1·905... 3 28
Ribbon marking for 14(a), 14(b) and 14(c). 14.(a)  5 in correct position. 4 in correct position. 7 in correct position.		 B1 B1 B1	 Strict FT 'their entries such that total number of students = 28. Allow 'double entries' in some parts for this FT, e.g. 'the 4 placed alongside the 1'.
Ribbon marking for 14(a), 14(b) and 14(c). 14.(b) 2		B1	Allow 'double entries' in some parts for a possible FT, e.g. 'the 4 placed alongside the 2'.
Ribbon marking for 14(a), 14(b) and 14(c). 14.(c) $\frac{16}{28}$ or equivalent ISW		B2	FT 'their total number for Biology' for the numerator. Allow 'double entries'. B1 for a correct numerator in a fraction <1. B1 for a denominator of 28 in a fraction <1. Penalise −1 for only words (16 out of 28) or only ratio (16:28).

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Ribbon marking for 15(a)(i) and 15(a)(ii). 15.(a) (i) 2		B1	Accept 12/6 or equivalent. The correct gradient has to be unambiguously shown. $y = 2x + 4$ is B0. Allow e.g. y = (2) x + 4 for B1.
Ribbon marking for 15(a)(i) and 15(a)(ii). 15.(a) (ii) $y = 2x + 4$		B2	F.T. 'their gradient' from (a) only if a whole number. B1 for $y = 2x \pm k$. B1 for $y = kx + 4$. B1 for 2x +4 ('y=' missing)
15.(b) (Both have) equal gradients of 2·5.		B2	Accept equivalent of 2·5. Accept $y = 2{\cdot}5x - 1{\cdot}5$ AND $y = 2{\cdot}5x + 1{\cdot}75$ for B2 unless a contradiction is seen. B1 for stating 'equal gradients' but not given as 2·5. B1 for sight of 2·5, or equivalent, but no mention of gradient. Also Correctly rewriting the equation(s) such that they show equal corresponding x and y coefficients, e.g. 2y = 5x – 3 and 2y = 5x + 3·5 gains a B1. In this case they need to make a further statement to show an understanding of gradients to gain 2nd B1.
16.(a) 3000 × 0·05 or equivalent. = 150		M1 A1	Allow 5% of 3000 for the M1. C.A.O. SC1 for sight of 3000 × 0·05 (= 150) within an incorrect solution. e.g. 1000 × 0·03 + 2000 × 0·042 + 3000 × 0·05 +… (= 30 + 84 + 150 + …..)
16.(b) 0·048 or equivalent e.g. 4·8% or 240/5000 Explanation e.g. 'all data used', 'last point plotted', 'the number of sockets tested was the highest'.		B1 B1	ISW from an answer given as a fraction. Accept any indication that the final reading should give the best estimate.

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17. BDC = 28(°) BCD = 90(°) BD = $\frac{4{\cdot}7}{\sin 28}$ BD = 10(·…)(cm)	 ✓ ✓ ✓✓ ✓	 B1 B1 M2 A1	*Angles may be shown on the diagram.* Allow D = 28. May be implied in later work. (Allow this B1 for any use of a right-angle triangle trigonometric relationship for triangle BCD) This implies previous B mark. FT 'their BDC'. M1 for $\frac{4{\cdot}7}{BD}$ = sin 28. *Alternative method* *COB = 56(°)* *B1* *OB =* $\frac{2{\cdot}35}{\sin 28}$ *M2* *(M1 for* $\frac{2{\cdot}35}{OB}$ *=sin 28)* *OB = 5(·…)(cm)* *A1* *BD = 10(·..)(cm)* *A1*
18.(a) $(x - 6)(x + 4)$ $(x =) 6$ AND $(x =) -4$		B2 B1	B1 for $(x$ ... $6)(x$ ... $4)$. Strict F.T. from their brackets. Allow the following. B2 for x – 6 (=0) AND x + 4 (=0) (B1) (x =) 6 AND (x =) − 4 (B1) B1 for x + 6 (=0) AND x − 4 (=0) (B0) (x =) −6 AND (x =) 4 (B1) FT B1 if only (x =) 6 AND (x =) – 4 seen (B1)
18.(b) $\frac{12x - 9 + 7x + 1}{(6)} = \frac{87}{(6)}$ $19x = 95$ $x = 5$	✓✓ ✓ ✓	B2 B1 B1	F.T. until 2nd error. B1 for 1 error. Subsequent work may show use of common denominator in order to award the B2. B0 for 95/19. If a F.T. answer is not a whole number then allow answer in form '*a / b'.* Mark final answer. Allow a correct embedded answer.