GCSE MARKING SCHEME

AUTUMN 2017

GCSE
MATHEMATICS
UNIT 1 - INTERMEDIATE TIER
3300U30-1

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INTRODUCTION

This marking scheme was used by WJEC for the 2017 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.

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GCSE Mathematics Unit 1: Intermediate Tier Autumn 2017 Final Mark Scheme	Mark	Comments
1.(a) 81 000	B2	B1 for sight of either 81 or 1000.
1.(b) 2	B1	Allow 2/1. Mark final answer.
1.(c) 1·78	B1	Mark final answer.
1.(d) <u>Correctly</u> using a common denominator. 1/6 or equivalent	M1 A1	 Mark final answer.
1.(e) 0.06	B1	Mark final answer.
2. FALSE FALSE TRUE TRUE TRUE	B3	For all 5 correct. B2 for 4 correct. B1 for 3 correct.
3.(a) (Volume of cuboid A =) 6 × 3 × 2 (= 36cm^3) OR (Volume of cuboid B =) 2 × 2 × h 6 × 3 × 2 = 2 × 2 × h OR 6 × 3 = 2 × h $\frac{6 \times 3 \times 2}{2 \times 2}$ = h OR 36 = 4h (h =) 9(cm) Organisation and Communication. Accuracy of writing.	M1 M1 m1 A1 OC1 W1	M1 for sight of 36 OR 4h. This implies M1M1. Award M1M1m1 for 6 × 3 × 2 = 2 × 2 × 9 (but not the A1) Allow correct FT value of 9 if 'their 6 × 3 × 2' ≠ 36 C.A.O. May be seen on diagram. 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 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
3.(b) 2500	B1	Answer space takes precedence.
4. $\frac{3}{5}$ or equivalent fraction (a/b)	B3	B2 for two of the conditions met. B1 for one condition met. Penalise −1 if the answer is given as a decimal or a percentage or a fraction containing a decimal.
5.(a) 6 and −3	B2	B1 for each. Allow F.T. for 2nd number if '9 less than previous number' AND negative.
5.(b) 15x – 10	B1	Must be an expression. Mark final answer.
5.(c) 9x – 4x = 5 – 3 5x = 2 OR −2 = −5x x = $\frac{2}{5}$ or equivalent.	B1 B1 B1	F.T. until 2nd error. Mark final answer. Do not allow x = −2/−5. A final answer of '2 ÷ 5' is B1B1B0.

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6.(a) 9	B1	Allow a list of all 9 numbers (no repeats or extras).
6.(b) 11, 13, 23, 31.	B2	All correct with no incorrect numbers. B1 for all correct with at most 2 incorrect. B1 for three correct and at most 1 incorrect. B1 for two correct and 0 incorrect.
6.(c) 4/9 ISW	B2	Correct answer OR F.T. 'their number of primes' / 'their (a)', provided the resulting fraction is between 0 and 1. B1 4/x with x>4 OR y/9 with y<9 or equivalent for FT. Penalise -1 if incorrect notation used e.g '4 out of 9'
6.(d) (Number of winners =) $\frac{4}{9} \times 180$ $= 80$ (Expected profit =) (£)180 – 80 × (£)2 = (£)20	M1 A1 M1 A1	F.T. 'their 4/9' if less than 1. M0 for '4/9 <u>of</u> 180' unless correct evaluation shown. A0 if incorrect reduction in (c) is used. F.T. 'their stated 80'. If the FT results in a loss then 'Loss' must be stated or the answer left as a negative.
7. (BÂD =) 360 – (85 + 122 + 93) = 60(°) (APQ = AQP =) $\frac{180 - 60}{2}$ = 60(°) A convincing statement AND the three angles shown as, or stated to be 60(°)	 M1 A1 M1 A1 E1	*This is a 'proof' question so the work for the M1 mark must be <u>seen</u> before the A1 mark can be awarded.* F.T. 'their 60' only if previous M1 awarded. Allow reference to isosceles triangle. Independent of previous marks. Must refer to three (all) angles being equal. Three angles of 60° must be shown or stated as part of a convincing statement. Reference to equal sides alone is E0.
8.(a) Kite	B1	
8.(b) Trapezium	B1	
8.(c) Rhombus	B1	
9.(a) −3 Scale on y-axis '2cm square ≡ 5 units'. OR '2cm square ≡ 4 units'. At least 5 correct plots and no incorrect plot. A smooth <u>curve</u> drawn through their plots.	B1 B1 P1 C1	 B0 for '2cm square ≡ 10 units'. F.T. 'their (−1,−3)' AND 'their uniform scale' if possible. Allow ±'½ a small square'. F.T. 'their 6 plots' OR a curve through the 5 given plots and (−1,−3). Allow for the intention to pass through their plots. (± 1 small square horizontal OR vertical).
9.(b) $y = x^2 + 3$	B1	
10.(a) Correct rotation.	B2	Allow B1 for two correct vertices. B1 for a 90° clockwise rotation about (−2,3) OR B1 for a 90° anticlockwise rotation about (3,−2).
10.(b) Correct enlargement.	B2	Allow B1 for two correct vertices. B1 for an enlargement of scale factor ½ but not centred at (0,0). Must be in the correct orientation. SC1 for a correct enlargement using a scale factor of −1/2 centred at (0,0).

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11.		*<u>Note :</u> Both E1 marks are awarded for a suitable/valid attempt at statement (not an implied reason from a calculation).* *Both E marks are dependent on attempt at related work.* *Look for angles seen on the diagram.* *For this question allow angles shown in diagram to take precedence over answer space.*
(RQP or QRP =) $\frac{180 - 30}{2}$	M1	
= 75(°)	A1	
Tangents (from external point) are equal (in length) OR a geometric consequence based on this fact (e.g. 'QPR is isosceles' or ' PQOR is a kite'.	E1	Accept any suitable attempt at a valid statement. Allow PQ = PR. Also allow unambiguous indication on the diagram. 'Angles in a triangle' not sufficient.
(OQR = 90 – 75 =) 15(°)	B1	F.T. 'their derived 75' provided acute.
Tangent and radius (at any point) are perpendicular	E1	Accept any suitable attempt at a valid statement. Also allow unambiguous indication on the diagram. *<u>Alternative method 1</u>* *(ROQ = 360−90−90−30 =) 150(°) B1* *Tangent and radius (at any point) are perpendicular. E1* *OQR = $\frac{180 - 150}{2}$ FT 'their derived 150' M1* *= 15(°) A1* *Radii form an isosceles triangle. E1* *<u>Alternative method 2 (with line OP drawn)</u>* *(POQ or RQP=) 180 −90 – 15 M1* *= 75(°) A1* *Tangents (from external point) are equal (in length) OR a geometric consequence based on this fact (e.g. 'QPR is isosceles' or ' PQOR is a kite'. E1* *(OQR = 90 – 75 =) 15(°) B1* *F.T. 'their derived 75' provided acute.* *Tangent and radius (at any point) are perpendicular. E1* *[Note: Do not 'mix and match' marks from alternative methods.]*
12. Arc, <u>centre P</u>, intersecting AB at two points. (B may be one of the points with no arc seen at point B)	M1	[Note to markers: These arcs may be identified by the fact that they will 'cross the line AB at an acute angle'. Arcs 'crossing the line at 90°' is evidence of an inappropriate method.]
Intersecting arcs (equal radii) using the above two points as centres.	m1	
Line drawn	A1	M1 and m1 must be gained before A1 is awarded. *<u>Alternative method.</u>* *Using the properties of a kite.* *Intersecting arcs whose centres are any two points on the line AB and respective radii equal in length to the distance from the points to the point P. M2* *[Note to markers: The arcs will always intersect at a point that is a 'reflection of point P' in the line AB.]* *Line drawn A1*

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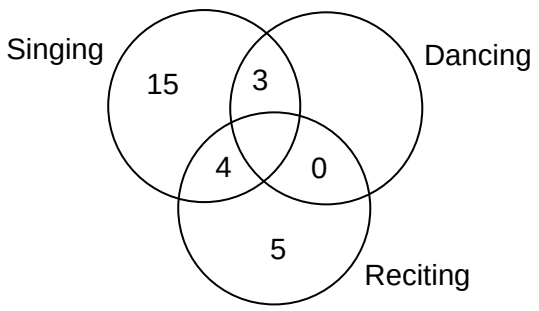
13.(a) $4{\cdot}2 \times 10^{-4}$	B1	
13.(b) $3{\cdot}6 \times 10^{8}$	B1	
13.(c) $4{\cdot}08 \times 10^{5}$	B2	B1 for sight of any correct value but not in standard form. e.g. $40{\cdot}8 \times 10^{4}$ or 408 000.
14. 		Allow empty space to imply 0.
5 AND 3 AND 0 in correct position. Total of 9 for 'Reciting'. Total of 22 for 'Singing'.	B1 B1 B1	C.A.O.
(Probability only took part in '*Singing*') $= \frac{15}{29}$ ISW	B2	15/29 gains all 5 marks. Otherwise, strict F.T. from 'their diagram'. B1 for a correct numerator in a fraction <1. B1 for a correct denominator in a fraction <1. Penalise -1 if incorrect notation used for probability e.g. '15 out of 29'.
15. $(x - 9)(x + 2)$ $(x =)\ 9$ AND $(x =)\ -2$	B2 B1	B1 for $(x \ldots 9)(x \ldots 2)$. Strict F.T. from their <u>brackets.</u> Penalise change of letter −1. If no factorising shown, allow the following. B2 for $x - 9\ (=0)$ AND $x + 2\ (=0)$ (B1) $(x =)\ 9$ AND $(x =)\ -2$ (B1) B1 for $x + 9\ (=0)$ AND $x - 2\ (=0)$ (B0) $(x =)\ -9$ AND $(x =)\ 2$ (B1) FT B1 if only $(x =)\ 9$ AND $(x =)\ -2$ seen. (B1)
16. Method to eliminate variable e.g. equal coefficients with <u>appropriate</u> addition or subtraction. First variable found, x = 3½ or y = 4. Substitute to find the 2nd variable. Second variable found	 M1 A1 m1 A1	*No marks for trial and improvement.* Allow 1 error in one term, not the term with equal coefficients. C.A.O. F.T. their '1st variable'.

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17. (Volume of cube =) m^3 OR $m \times m \times m$ OR $m^2 \times m$	B1	For sight of m^3 or equivalent.
(Volume of cylinder =) = $\frac{\pi m^3}{4}$ OR $\frac{\pi \times m \times m \times m}{4}$ OR $\frac{\pi \times m^2 \times m}{4}$	B2	For sight of $\pi m^3/4$ or equivalent. B1 for $\pi \times \left(\frac{m}{2}\right)^2 \times m$. Also allow this B1 if brackets are missing. $m^3 : \frac{\pi m^3}{4}$ OR $4m^3 : \pi m^3$ OR $1 : \frac{\pi}{4}$ all imply B1B2.
$k = 4$	B1	Allow B1 if left as $4 : \pi$. F.T only for $\pi m^3 / 2$ (giving $k = 2$ or $2 : \pi$) Note : If a value is used for m then mark as above and penalise −1 from total mark gained.

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