GCSE MARKING SCHEME

AUTUMN 2018

GCSE
MATHEMATICS
UNIT 1 - HIGHER TIER
3300U50-1

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 (3300U50-1)

AUTUMN 2018 MARK SCHEME

GCSE MATHEMATICS November 2018 **Unit 1: Higher Tier**	**Mark**	**Comments**
1.(a) $3x^3 - 6x$	B2	Must be in an expression for B2. B1 for sight of $(+)3x^3$ or $-6x$. Mark final answer.
1.(b) $3g = 2 - f$ or $f - 2 = -3g$ $g = \frac{2-f}{3}$ or $g = \frac{f-2}{-3}$ or $g = \frac{2}{3} - \frac{f}{3}$	B1 B1	F.T only from $(\pm)3g = \pm f \pm 2$. B1B0 for $-g = \frac{f-2}{3}$. B1B0 for $g = 2 - f \div 3$. B1B0 for $\frac{2-f}{3}$ ('g' missing). Mark final answer.
1.(c)(i) $7x < 32$ $x < 32/7$ or $x < 4^4/_7$	B1 B1	Use of '=' is B0B0 unless replaced for final answer. FT from $7x < k$. Allow $x < 4{\cdot}57(\ldots)$. Do not allow $x < 4{\cdot}6$ or $x < 4{\cdot}5$ unless $x < 4{\cdot}57(\ldots)$ seen. Mark final answer. Penalise consistent use of '≤' by –1.
1.(c)(ii) 4	B1	OR F.T. 'their answer (inequality) in (c)(i)' if $x < a$. No FT from $x \le a$. 4x is B0.
2. Angle BAC bisected OR Unique point P shown within tolerance of angle bisector Arc, radius 6 cm, centre B OR Unique point P shown 6 cm (± 2mm) from B Correct point P shown.	 B1 B1 B1	*Allow ± 2° and ± 2mm* Accept correct construction or use of protractor. Of sufficient length to be identified. Allow F.T. from any previous B0 if equivalent decision required for identifying position of P i.e. an arc, centre B, intersects a straight line drawn from A at two points, with only one of these points over 10 cm from A. A correct point P gains all 3 marks.
3.(a) Sight of (£)720 ÷ 9 or (£)80 (£)160 AND (£)560	M1 A1	Allow in any order. Allow (£)160 : (£)560 or (£)560 : (£)160 Sight of (£)160 or (£)560 implies M1
3.(b) 5	B2	B1 for sight of $\frac{1}{0{\cdot}2}$ or $\frac{10}{2}$ or $\frac{5}{1}$ or equivalent. Mark final answer.
4.(a) $3{\cdot}14 \times 10^2 \times 20$ or $\pi \times 10^2 \times 20$ $= 6280\ (cm^3)$	M1 A1	M1 A0 for 2000π Allow M1A1 if 6280 seen in 4(b).
4.(b) 6 (litres)	B1	A **strict** F.T. of 'their 6280' /1000 and truncated. Truncation is required for the B1.
5. Median value > 6 Total of five numbers < 40 Range < 12	B1 B1 B1	Possible to allow if enough boxes completed to ensure median > 6. All boxes must be completed. All boxes must be completed. Penalise −1 once from any marks gained if a negative number or a number ≥ 20 or non-whole numbers used.

6.(a)(i) 49	B1	
6.(a)(ii) 1	B1	
6.(a)(iii) 15	B1	
6.(a)(iv) $\frac{1}{81}$	B1	
6.(b) (n =) 30	B2	Allow for an answer of 2^{30}. B1 for sight of $2^2 \times 2^{28}$ or $2 \times 2 \times 2^{28}$.
7. AOB = 148(°)	B1	May be seen on the diagram. Do not accept 148 unless unambiguously associated with angle AOB (stated, or on diagram, or used for M1).
Angle subtended by an arc at the centre of a circle is twice the angle subtended at the circumference.	E1	Dependent on 2 × 74 (= 148) seen. Accept any unambiguous wording. E0 for simply stating 'twice 74'.
$x = \frac{180 - 148}{2}$	M1	FT 'their derived or stated angle AOB'. NOT 74°. x = 90 – 74 is B1E0M1 (E1 if a full and accurate explanation is given.)
= 16	A1	Unsupported (x =) 16 gains B1E0M1A1.
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
8.(a) 0·32	B1	
8.(b) (i) 600 × 0·34	M1	
= 204	A1	
8.(b)(ii) 204 – 600/6	M1	F.T. 'their 204'.
=104	A1	M1A1 for '104 out of 600' BUT M1A0 for '104/600'. FT for A1 provided answer is a positive integer.
9. Sight of at least two correct different surface areas.	B1	Sight of two of $35(cm^2)$, $5x(cm^2)$, $7x(cm^2)$.
2 × (35 + 5x + 7x) = 142 or equivalent	M2	Allow M1 for 'sum of at least 3 correct surface areas = 142'.
x = 3	A1	C.A.O. If M0, allow SC1 for x = 3 with no prior equation shown.

10. Enlargement with scale factor -2 and centre (4, 6)	B3	Accept candidate's appropriate terminology for 'scale factor' or 'centre'. If B3 not awarded: Award B2 for reference to any two of 'Enlargement', '-2' or 'centre (4, 6)' (in a **single** transformation). Award B1 for reference to any one of 'Enlargement', '-2' or 'centre (4, 6) (in a **single** transformation). The centre may be identified by rays or by a point **with** coordinates stated. A multi-stage transformation gains a maximum of 1 mark.
11. Lines $x = -1$, $y + 2x = 1$ and $y = x$ all correct. Correct region identified.	B2 B1	B1 for any 2 correct lines. If $x = -1$ and $y = -1$ are both shown, do not award a mark unless $x = -1$ is selected for the region or clearly labelled. FT provided region is closed and B1 awarded. Accept indication by 'shading out'.
12. $F \propto 1 / d^2$ OR $F = k / d^2$ $4 = k / 10^2$ OR $k = 400$ $F = 400 / d^2$ $100 = 400 / d^2$ or equivalent $d = 2$ (m)	B1 M1 A1 M1 A1	Allow $F \propto k / d^2$ M1 implies B1. F.T. for use of $F \propto d^2$ or $F \propto 1 / d^n$ with $n > 0$ and $n \neq 2$. May be implied by further work. F.T. (for M1 only) from consistent $F \propto d^2$ or $F \propto 1 / d^n$ with $n > 0$ and $n \neq 2$. CAO. Ignore presence of '±' for the value of d. Use of $F \propto 1 / d$, leading to $F = 40 / d$ (and an answer of $d = 0{\cdot}4$ (m)), is awarded B0 FT M1 A1 M1 A0. Use of $F \propto d^2$, leading to $F = 0.04d^2$ (and an answer of $d = 50$ (m)), is awarded B0 FT M1 A1 M1 A0. Use of $F \propto 1/\sqrt{d}$, leading to $F = 4\sqrt{10} / \sqrt{d}$ (and an answer of $d = 0{\cdot}016$ (m)), is awarded B0 FT M1 A1 M1 A0.
13. $6c - 3d = g(c + 2)$ $6c - gc = 3d + 2g$ $c(6 - g) = 3d + 2g$ $c = (3d + 2g)/(6 - g)$ or equivalent	 B1 B1 B1 B1	FT until 2nd error, provided equivalent difficulty. May be implied by further working. Includes correct expansion **and** rearrangement. Mark final answer.

14. (Total area =) (2 ×) $\pi \times 30^2 \times 20 / 360$ or equivalent (= 100 π) $100\pi = \pi r^2$ r = 10 (cm)	M1 m1 A1	Accept use of 3·14 for π. Equating 'their derived 100π' or equivalent CAO
15. (a) x = 0·37777..... 10x = 3·7777..... with an attempt to subtract 34/90 or 17/45 or equivalent e.g. 374/990	M1 A1	Or 10x and 100x, or equivalent. Or an alternative method. An answer of 3·4/9 gains M1 only. Mark final answer. Do not ignore incorrect cancelling.
Alternative method *0·3 + 0·07777..... = 3/10 + 7/90 or equivalent* *34/90 or 17/45 or equivalent*	*M1* *A1*	*Mark final answer. Do not ignore incorrect cancelling.*
15. (b) (i) $\sqrt{8}\sqrt{8} - \sqrt{8}\sqrt{2} - \sqrt{8}\sqrt{2} + \sqrt{2}\sqrt{2}$ or $\sqrt{64} - \sqrt{8}\sqrt{2} - \sqrt{8}\sqrt{2} + \sqrt{4}$ or equivalent (= 8 − 4 − 4 + 2) = 2	M1 A1	 Mark final answer. If no marks, award SC1 for 3 correctly evaluated terms.
Alternative method: *$(2\sqrt{2} - \sqrt{2})^2$* *= 2*	*M1* *A1*	*An answer of $(\sqrt{2})^2$ gains M1A0 only* *Mark final answer.*
15. (b) (ii) $2\sqrt{10}$	B2	B1 for $\sqrt{40}$ or $\sqrt{2}$ x $2\sqrt{5}$ or 2 x $\sqrt{30}$ / $\sqrt{3}$
15. (c) 1/64	B2	B1 for 64^{-1} or $1/4^3$ or $(1/4)^3$ or $1/\sqrt{4096}$ or $1/4096^{1/2}$ or $(1/4096)^{1/2}$ or $\sqrt{(1/4096)}$ or SC1 for – 1/64 Allow ±1/64 for B2
16. (Numerator) $(4x + 1)(x - 2)$ (Denominator) $4(x - 2)$ $\frac{4x + 1}{4}$ or $x + \frac{1}{4}$ $(x \neq 2)$	B2 B1 B1	B1 for $(4x \ldots 1)(x \ldots 2)$ Allow equivalent e.g. $(x \ldots 0{\cdot}25)(4x \ldots 8)$ Mark final answer. FT provided no more than 1 previous error and provided simplification required.

17. (a) sight of 4/10 × 1/9 OR 1/10 × 4/9 4/10 × 1/9 + 1/10 × 4/9 OR 4/10 × 1/9 × 2 = 8/90 (= 4/45)	M1 M1 A1	 Complete correct method. ISW SC1 for method <u>with</u> replacement, leading to an answer of 8/100.
17. (b) 1 – P(both the same colour) = 1 – [5/10 × 4/9 + 4/10 × 3/9] (= 1 – 32/90) = 58/90 (= 29/45)	M1 M2 A1	FT a repeated incorrect total from part (a). <u>Complete</u> correct method. M1 for 1 numerical slip. Accept presence of a correct product of 1/10 × 0/9 for P(GG). ISW. If no marks awarded, SC1 for sight of 32/90 (probability of both the same colour) SC1 for an answer of 70/90 (from 1 – P(R,R)) SC1 for an answer of 78/90 (from 1 – P(Y,Y)) SC2 for method <u>with</u> replacement, leading to an answer of 58/100. SC1 for method <u>with</u> replacement, without a related answer or with 1 numerical slip or without considering P(GG) (59/100).
<u>Alternative method 1</u>: *P(RY or YR or YG or GY or GR or RG)* *= 4/10×5/9 + 5/10×4/9 + 5/10×1/9 + 1/10×5/9 + 1/10×4/9 + 4/10×1/9 or equivalent* *= 58/90 (= 29/45)*	*M1* *M2* *A1*	*<u>Complete</u> correct method. M1 for 1 numerical slip. FT 'their part (a)' for P(RG) + P(GR).* *ISW* *If no marks awarded,* *SC2 for this method and related answer, having omitted one product (out of 6)* *SC2 for an answer of 29/90 (from P(RY or YG or GR))* *SC1 for this method, having omitted one product, with no related correct answer* *SC1 for this method and related answer, having omitted two products*
<u>Alternative method 2</u>: *P(RR' or YY' or GG')* *= 4/10×6/9 + 5/10×5/9 + 1/10(×9/9)* *= 58/90 (= 29/45)*	*M1* *M2* *A1*	*<u>Complete</u> correct method. M1 for 1 numerical slip or M1 if 'doubling' is seen (at any stage)* *ISW* *If no marks awarded,* *SC1 for this method and related answer, having omitted one product (out of 3)*
18. Translation horizontally to the right (only) (4, 2) indicated correctly.	B1 B1	 Minimum point at (4, 2). SC1 for left shift with (-4, 2) indicated.