



GCSE MARKING SCHEME

SUMMER 2017

**GCSE (NEW)
MATHEMATICS - UNIT 1 (HIGHER)
3300U50-1**

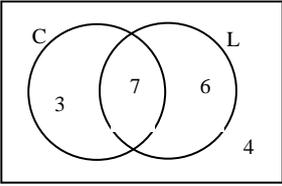
INTRODUCTION

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.

GCSE MATHEMATICS Unit 1 : Higher Tier Summer 2017		✓	Mark	MARK SCHEME Comments (Page 1)
1.(a)	$0.25 + 0.2$ = 0.45 or equivalent.		M1 A1	
1.(b)	0.4×0.4 = 0.16 or equivalent.		M1 A1	
2.(a)	-4		B1	
2.(b)	At least 6 correct plots and <u>no incorrect plot</u> . A smooth <u>curve</u> drawn through their plots.		P1 C1	F.T. 'their (3,-4)'. Allow \pm '½ a small square'. F.T. 'their 7 plots'. OR a curve through the 6 given points and (3,-4). Allow intention to pass through their plots. (\pm '1 small square horizontal or vertical').
2.(c)	Line $y = -3$ drawn 1.4 AND 3.6		B1 B1	F.T. intersection of 'their curve' with 'their $y = -3$ ' only if exactly two points of intersection. Allow \pm '1 small square'.
3.(a)	For a method that produces 2 prime factors from the set {2, 2, 5, 5, 7} before the 2 nd error. 2, 2, 5, 5, 7 $2^2 \times 5^2 \times 7$		M1 A1 B1	C.A.O. For sight of the five correct factors (Ignore 1s) F.T. 'their primes' provided at least one index form used with at least a square. Do not F.T. non-primes. Allow $(2^2)(5^2)(7)$ and $2^2.5^2.7$ Do not allow $2^2, 5^2, 7$. Inclusion of 1 as a factor gets B0.
3.(b)	Any reference to the index being an odd number. e.g. 'power must be even', '25 is odd' etc.		E1	Do not accept e.g. 'should be 2^{24} ', 'it isn't even'.
4.(a)	$y = -x + 2$		B1	
4.(b)	(2, 5)		B1	
4.(c)	$\frac{2}{3}$		B1	
5.	7	✓ ✓ ✓	B3 OC1	B2 for 5. B1 for 4 or 6 or 8 or 9 If no marks awarded allow SC1 for 11 or 13 or 17. For OC1, candidates will be expected to: <ul style="list-style-type: none"> • 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

GCSE MATHEMATICS Unit 1 : Higher Tier Summer 2017	✓	Mark	MARK SCHEME Comments (Page 2)
6. (volume) Area Length None Area Volume		B3	<i>Must use the terminology given in the question.</i> B3 for all 5 correct. B2 for 3 or 4 correct. B1 for 2 correct. B0 otherwise.
7.(a) 		B1 B1 B1	Any 'blank space' to be taken as 0. For the 4 in correct position. For the 7 in correct position. For the 3 AND 6 in correct positions. OR two of the following conditions met (i) 10 – 'their (non-zero) 7' (ii) 13 – 'their (non-zero) 7'. (iii) total of four numbers = 20. SC1 for all regions correct but using alternative notation e.g. tallies.
7.(b) 9/20 or equivalent. ISW		B2	B1 for a numerator of 9 (F.T. 'their 3' + 'their 6') in a fraction < 1. B1 for a denominator of 20 in a fraction < 1.
8. Method to eliminate variable e.g. equal coefficients with intention to <u>appropriately</u> add or subtract. First variable found $x = 5$ or $y = -2$. Substitute to find the 2 nd variable. Second variable found.	✓ ✓ ✓ ✓	M1 A1 m1 A1	<i>No marks for 'trial and improvement'.</i> Allow 1 error in one term, not one with equal coefficients. C.A.O. F.T. their '1 st variable'.
9. 5.64×10^5		B2	B1 for correct answer not in standard form e.g. 564000, or 56.4×10^4 . Allow B1 for 5.6×10^5 .
10. $4n - 8 > n + 17$ $3n > 25$ $n > 25/3$ (least value of $n =$) 9 Accuracy of writing.	✓ ✓ ✓ ✓ ✓	B2 B1 B1 B1 W1	If not B2, allow B1 for sight of $4n - 8$ AND $n + 17$ in an inequality. F.T. from 'their <u>inequality</u> ', if of equivalent difficulty (2 terms on each side). F.T. from 'their $a > b$ ' or 'their $a < b$ ' provided $a \neq 1$. F.T. from their ' $n > 25/3$ ', provided $n > 0$. An answer of 9 without showing $4n - 8 > n + 17$ gains B3 only. Accept 'Rashid had 9 (sheep)'. Accuracy of writing. For W1, candidates will be expected to: <ul style="list-style-type: none"> 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

GCSE MATHEMATICS Unit 1 : Higher Tier Summer 2017	✓	Mark	MARK SCHEME Comments (Page 3)
11.(a) 1/7		B1	
11.(b) $x = 0.37272\dots$ AND $100x = 37.2727\dots$ with an attempt to subtract. $\frac{369}{990}$ ISW (= 41/110)		M1 A1	Or $10x$ AND $1000x$ or equivalent with an attempt to subtract. An answer of $36.9 / 99$ gains M1 only. <u>Alternative method</u> $0.3 + 0.0727272\dots = 3/10 + 72/990$ or equivalent M1 $369/990$ (= 41/110) ISW A1
11.(c) $(\sqrt{63})^2 - \sqrt{63}\sqrt{7} - \sqrt{63}\sqrt{7} + (\sqrt{7})^2$ $= 63 - \sqrt{441} - \sqrt{441} + 7$ $= 28$		B1 B1 B1	Accept equivalent methods of processing $\sqrt{63}\sqrt{7}$ e.g. $\sqrt{9}\sqrt{7}\sqrt{7}$ or $3(\sqrt{7})^2$. F.T. only from ' $(\sqrt{7})^2$ ' in first line. Accept '14' only if as a result of F.T. ' $(\sqrt{7})^2$ ' in first line. If no marks awarded, SC1 for 3 out of 4 terms correct in initial expansion. <u>Alternative method</u> $\sqrt{63} = 3\sqrt{7}$ B1 $(2\sqrt{7})^2$ B1 $= 28$ C.A.O. B1
12. ACB = 74(°) Alternate segment (theorem) CAB (= 180 – 53 – 74) = 53(°) (Sum of) angles in a triangle (equals 180°) Concluding statement e.g. 'triangle ABC is isosceles as it has two equal angles.'	✓ ✓ ✓ ✓ ✓	B1 E1 B1 E1 E1	All 'E1' marks are dependent on associated 'B1' marks. By applying the alternate segment theorem. Check diagram. FT from B1 E0, but not from B0 E0. Must justify <u>why</u> the triangle is isosceles i.e. stating (only) 'triangle is isosceles' at this stage is insufficient. <u>Alternative method</u> CAX = 53(°) (by applying the alternate segment theorem) B1 Alternate segment (theorem) E1 CAB (= 180 – 53 – 74) = 53(°) B1 (Sum of) angles on a straight line (equals 180°) E1 Concluding statement. E1 Be aware of equivalent methods (e.g. drawing a radius to the centre O etc.). These methods must lead to a proof before any marks are awarded.
13(a) Any two of the three lines correct. $(x + y = 6 \quad y = x/2 + 3 \quad x = -2)$ Correct region identified.		B2 B1	B1 for any one line correct. CAO.
13.(b) (i) $(x =) 2$ (ii) $(y =) 8$		B1 B1	FT 'their region', if possible, for both B1 marks, provided it is of equivalent difficulty.
14.(a) not necessarily congruent		B1	
14.(b) definitely not congruent		B1	
14.(c) SAS		B1	

GCSE MATHEMATICS Unit 1 : Higher Tier Summer 2017	✓	Mark	MARK SCHEME Comments (Page 4)
15.(a) Correct sine curve with 1 and -1 shown on the y-axis and 180° and 360° shown on the x-axis.		B2	Multiple cycles gain both marks only if both axes fully correctly labelled for x between 0 and 360. If B2 not awarded, B1 for a sine curve (single cycle) with missing values on axes OR B1 for multiple cycles with (only) x axis correctly labelled.
15.(b) $\sin 340^\circ$		B1	
16. $3x(x - 3) + x(x - 1) (= 50)$ $4x^2 - 10x = 50$ $2x^2 - 5x - 25 = 0$ $(2x + 5)(x - 5) [= 0]$ $x = 5$	✓ ✓ ✓ ✓✓ ✓	M1 m1 A1 B2 B1	Must be seen. Allow $3x(2x - 4) - 2x(x - 1)$ for M1 Must be seen. Convincing. B1 for $(2x \dots 5)(x \dots 5) [= 0]$ Strict F.T. only if one +ve value and one -ve value possible. B0 if negative value not discarded. <u>Using formula</u> $(5 \pm 15) / 4$ B2 (B1 for correct intent with 1 slip.) $x = 5$ B1 (B0 if -2.5 not discarded.) <u>Using trial and improvement</u> Award B2 for a method leading to <u>both</u> solutions, namely $x = 5$ and $x = -2.5$ (with a further B1 for subsequently discarding $x = -2.5$) otherwise B0.
17.(a) $\frac{6 \times 4 \times 2}{12 \ 11 \ 10}$ $= \frac{48}{1320}$ or equivalent (2/55) ISW		M1 A1	SC1 for 48/1728 or equivalent (1/36) (With replacement)
17.(b) $\frac{6 \times 5 \times 4}{12 \ 11 \ 10} + \frac{4 \times 3 \times 2}{12 \ 11 \ 10}$ $= \frac{144}{1320}$ or equivalent (6/55) ISW		M2 A1	F.T. consistent use of incorrect total from part (a). If a product is included for P(YYY), it must be worth zero in order for M2 to be awarded. M1 for either of the two (non-zero) terms or for a sum of 2 correct products and 1 incorrect. C.A.O. SC1 for 288/1728 or equivalent (1/6) (With replacement)
17.(c) $\frac{1176}{1320}$ or equivalent (49/55) ISW		B1	F.T. 1 - 'their 144/1320'.
18. Sight of (0), 1, 4, 9, 16, 25 and 36. Split into 6 areas AND attempt to add derived areas Correct substitution into trapezium rule. Area = $\frac{1}{2} [0 + 36 + 2(1 + 4 + 9 + 16 + 25)]$ $= 73$	✓ ✓ ✓ ✓	B1 M1 M1 A1	<i>Penalise -1 once only for a <u>consistent</u> misreading of one scale.</i> If using 6 separate areas, at least one area calculation (for a trapezium) should be potentially correct. 1st M1 may be implied by correct use of formula. Or equivalent $(0.5+2.5+6.5+12.5+20.5+30.5)$ F.T. 'their values of y' provided at least 2 correct. Allow 1 slip e.g. in a y-value term, in h, or in an individual area. C.A.O.
19. Sight of $4\pi r^2$ AND $6r^2$ Convincing argument, e.g. $4\pi \neq 6$, or $\pi = 1.5$ (or equivalent), which is not true.		B1 E1	E1 depends on B1 having been awarded.