



GCSE MARKING SCHEME

SUMMER 2017

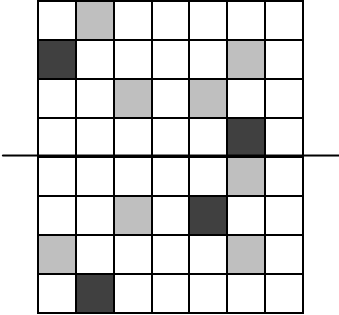
**GCSE (NEW)
MATHEMATICS - UNIT 1 (FOUNDATION)
3300U10-1**

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.

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GCSE Mathematics Unit 1: Foundation Tier Summer 2017	✓	Mark	Comment
1. (a) 50 004		B1	
1. (b) 80(p)		B2	B1 for $720(p) \div 9$ or (£)0.8(0)(p) or £80
1. (c) 4 and 5		B2	B1 for at least two different pairs of numbers which add to 9 OR B1 for at least two different pairs of numbers which have a product of 20 OR B1 for one pair that adds to 9 and one pair that has a product of 20.
2. Evidence of counting squares 81 – 91 (cm ²)		M1 A1	
3. 		B2	B1 for all 4 correct squares and no more than 2 extra squares OR B1 for 3 correct squares and no more than 1 incorrect squares OR B1 for 2 correct squares and no incorrect squares
4. (a) obtuse		B1	
4 (b) cuboid		B1	
5. (a) Dragons 35 Ospreys 45 Scarlets 40		B3	B2 for any two correct entries OR any one correct entry with evidence of correct scale indicated by at least one correct value and no incorrect value B1 for any one correct entry OR correct scale OR sight of '1 square = 5 pupils' OR sight of '2 squares = 10 pupils'
5. (b) 50/170 or equivalent ISW		B2	B1 for a numerator of 50 in a fraction less than 1. B1 for a denominator of 170 in a fraction less than 1. B1 for use of words such as '50 out of 170', '50 in 170' or '50:170'. If words and correct notation seen, then ignore the words.

6. (a) A (3, 2) B (1, -4)		B1 B1	
6. (b) C (2, -1)		B2	B1 for a clear indication of the position of C <u>Alternative method</u> FT 'their coordinates' for A and B $([x_1 + x_2]/2, [y_1 + y_2]/2)$ M1 Correct evaluation A1
7. (a) (i) $(x=)$ 8		B1	Accept embedded answers Mark final answer
7. (a) (ii) $(y=)$ 64		B1`	Accept embedded answers Mark final answer
7.(b) 4k		B1	
8. (a) 81		B1	
8.(b) 84		B1	
9. 10.3 cm 46° 59		B1 B1 B1	± 2 mm $\pm 2^\circ$ $\pm 2^\circ$ If B3 awarded, penalise -1 if the triangle is incomplete OR if a ruler is not used
10.(Number of circles on the length= $100 \div 5$ (=20) OR (Number of circles on the width =) $30 \div 5$ (=6) (Number of circles =) 6×20 120	✓ ✓ ✓ ✓ ✓	M1 m1 A1 OC1 W1	Accept either 5×20 (=100) OR 5×6 (=30). FT 'their 6' and 'their 20' if M1 awarded CAO Organisation and Communication. 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 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

11.(a)	1 and -5		B2	B1 for 1. B1 FT 'their 1' - 6.
11.(b)	- 6 + 70 = 64		B1 B1	B1 for sight of - 6 OR 70 (but not -70). B0 for -6x + 70y. C.A.O. Mark final answer.
12.	Showing (0.4), 0.15 and 0.35 OR 40% , (15%) and 35% OR 8/20, 3/20 and (7/20) OR three correct calculations for a common amount. 15% 7/20 0.4 in order		B2 B1	B2 for all correct decimals, OR all correct %, OR all correct fractions <u>with a common denominator</u> , OR correct work using a common amount, OR a valid combination that allows full comparison. B1 for one correct conversion <u>that still allows a full comparison</u> . (i.e. allow one error in attempt at common format.) Allow any unambiguous indication. F.T. 'their work' if at least B1 gained. Unsupported correct answer gains B1 only.
13.	Correct enlargement.		B2	Allow any orientation. B1 for one side correctly enlarged. SC1 for an enlargement by a factor of 2 or 4.
14.(a)	1/6		B1	
14.(b)	10		B1	
14.(c)	6 blue 6 yellow 3 pink		B1	
15.	(Team A) 12 (Team B) 3		B2	B1 for values that satisfy $A - B = 9$ OR $A = 4 \times B$. e.g. final working line of 10 and 1 (or 8 and 2) would be awarded B1 if not contradicted in the answer space. SC1 for reversed answer $A = 3$ and $B = 12$.
16.	(David – Hr Jane – Rh Mary – P) David – Hr Jane – P Mary – Rh David – Rh Jane – Hr Mary – P David – Rh Jane – P Mary – Hr David – P Jane – Hr Mary – Rh David – P Jane – Rh Mary – Hr		B2	Allow any unambiguous notation e.g. 'DH'. For all other 5 different combinations. Do not penalise repeats. B1 for 3 or 4 other different combinations. B0 otherwise.

17.(a)	$x + 2x + 3x + 90 = 360$ or equivalent $\begin{array}{r} 6x = 270 \\ x = \frac{270}{6} \\ = 45 \end{array}$	✓ ✓ ✓ ✓	M1 A1 A1 A1	<p>Allow M1 for attempting sum of $a + b + c + 90$ with ratio $a:b:c = 1:2:3$ and <u>clearly</u> using trial and improvement to aim for a total of 360.</p> <p>F.T. from $ax = b$.</p> <p>Allow SC2 for an answer of 15 (from '$= 180$')</p>
17.(b)	<p>Correct use of $2x = 90(^{\circ})$ 'Yes' AND correct justification. e.g. 'Yes because of interior angles', 'Yes as lines are perpendicular to the base' 'Both A and B are 90°'.</p>		B1 E1	<p>F.T. 'their value of x'. Must be used in justification. Dependent on B1 with F.T. justification.</p> <p><u>Alternative method for the B1 mark</u> Use of $3x = 135(^{\circ})$ AND $x = 45(^{\circ})$</p>
18(a)	$\frac{40 \times 30}{200} \quad \text{OR} \quad \frac{41 \times 30}{200}$ $= 6 \quad \text{OR} \quad 6.15 \text{ or } 6$		M1 A1	<p>Unsupported answer (M0) is also A0.</p>
18.(b) (i)	454 680		B1	
18.(b) (ii)	842		B1	
18.(b) (iii)	5.4		B1	
19.	<p>(Use of area of PBCQ $\Rightarrow 52 - 20 (= 32 \text{ cm}^2)$ (Area of PBCQ $\Rightarrow 8 \times f = 32$ $f = 4$ (Area of APQD $\Rightarrow 4 \times g = 20$ $g = 5$</p>	✓ ✓ ✓ ✓ ✓	B1 M1 A1 M1 A1	<p>Answers /working may be seen on diagram.</p> <p>F.T. 'their derived 32' but not 52 [B1M1 implied by $8f = 32$] C.A.O. (implies B1M1A1)</p> <p>F.T. 'their f'.</p> <p><u>Alternative method</u></p> $f \times (g + 8) = 52 \quad M1$ $[fg + 8f = 52]$ $fg = 20 \quad M1$ <p>[M2 implied by $20 + 8f = 52$ or $8f = 32$]</p> $f = 4 \quad A1 \quad \text{C.A.O.}$ $4 \times g = 20 \quad M1 \quad \text{FT 'their f'}$ $g = 5 \quad A1$



GCSE MARKING SCHEME

SUMMER 2017

**GCSE (NEW)
MATHEMATICS - UNIT 2 (FOUNDATION)
3300U20-1**

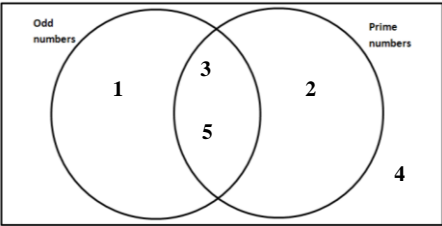
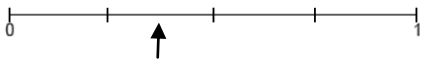
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GCSE Mathematics Unit 2: Foundation Tier Summer 2017		Mark	MARK SCHEME Comments
1.	778 905 35 645	B1 B1 B1 B1	
2.	< > < <	B2	For all 4 correct. B1 for any three correct. Penalise once only for use of \leq or \geq .
3.(a)(i)	Circle radius 5cm \pm 2mm	B1	Use overlay. Continuous line that is drawn with a pair of compasses. Condone failure to use x as the centre.
3.(a)(ii)	10 cm or equivalent	B1	F.T. their circle drawn with a pair of compasses. Units required for B1.
3.(b)	Equilateral triangle	B1	
4.	5, 9, 10	B3	Answers in the spaces provided take precedence. B2 for meeting 3 of the 4 conditions: <ul style="list-style-type: none"> the three numbers are different one number is a square number the other two numbers are factors of 20 the sum of the three numbers is 24 B1 for meeting 2 conditions OR for listing either three different square numbers or three different factors of 20.
5.(a)	3	B1	
5.(b)	Square	B1	Accept regular quadrilateral.
6.(a)	5530	B2	B1 for 5529(.411.....) OR B1 for 5520
6.(b)	32.36	B2	B1 for 32.35(889....) OR B1 for 32.4
7.	18	B2	B1 for either 24 or -6. B0 for 24x or -6y.
8.	Intention to halve 9 minutes 18 seconds OR double 4 minutes 48 seconds NO, with sight of 4 minutes 39 seconds OR 9 minutes 36 seconds, or 279 (seconds) AND 288 (seconds) or 558 (seconds) AND 576 (seconds)	M1 A1	Accept equivalent statements e.g. Eira is wrong Allow incorrect notation for time e.g. 4.39, 9.36 (use of decimal points) <u>Alternative method 1</u> Correctly finding the difference between the two times as 4 minutes 30 seconds OR 270 seconds M1 NO, with comparison e.g. 4 minutes 30 seconds is less than 4 minutes 48 seconds OR 288 seconds is more than 270 seconds A1 <u>Alternative Method 2</u> Converting both times to seconds, before dividing one quantity by the other M1 NO, with sight of 2(.06...) OR 0.4(84375...) A1 If no marks, award SC1 for attempting to find the difference between the two times and comparing this with 4 minutes 48 seconds.

GCSE Mathematics Unit 2: Foundation Tier Summer 2017	Mark	MARK SCHEME Comments
9. 	B2	B2 for all fully correct Award B1 for 3 or 4 correct <i>Any duplicates are marked as incorrect.</i>
10. (Width of square = $56 \div 4 =$) 14 (cm) (Area of square =) 14^2 $= 196 \text{ (cm}^2\text{)}$ Organisation and Communication Accuracy of writing.	B1 M1 A1 OC1 W1	F.T. 'their width', provided $\neq 56$. 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 explanations and working in a way that is clear and logical 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.
11.(a) 3	B1	
11.(b) unlikely	B1	
11.(c) 	B1	Any indication of $\frac{1}{4}$ to $\frac{1}{2}$ exclusive.
12.(a) $0.39 \times (\pounds)576$ or equivalent $= (\pounds)224.64$ ISW	M1 A1	Do not accept approximating e.g. $10\% = \pounds 58$ etc. Allow $\pounds 224.64p$ and $22464p$ but not 22464 .
12.(b) 43	B2	B1 for sight of $42.8(\dots)$ or 42.9 or $42\frac{8}{10}$ or $300/7$. Allow SC1 for 42. B0 for $300 \div 7$.
12.(c) 40	B1	Accept embedded answers e.g. $0.25 \times 40 = 10$.
12.(d) $\frac{1}{12}$ or equivalent fraction	B1	Mark final answer. B0 for $\frac{0.5}{6}$, $0.083\ldots$ etc.
12.(e) $\frac{10}{12}$	B1	
13. TRUE FALSE TRUE TRUE TRUE FALSE	B3	For all 5 correct. B2 for 4 correct. B1 for 3 correct.
14. $(7 \times 3 =)$ 21	B2	B1 for sight of $7 \times a$ (or $a \times 7$) OR $b \times 3$ (or $3 \times b$) OR 7 OR 3 unambiguously identified.
15.(a) 15	B1	
15.(b) 5	B1	Allow unambiguous indication of an answer of 5.

GCSE Mathematics Unit 2: Foundation Tier Summer 2017	Mark	MARK SCHEME Comments
16. 8, 15 and 16 OR 9, 13 and 17 OR 10, 11 and 18.	B2	All three numbers must be less than 25. B1 for three numbers with a range of 8. B1 for three numbers whose total = 39.
17.(a) -3, -1 and 1	B2	B1 for any two correct in the correct positions OR B1 for -5, -3 and -1 OR B1 for -1, 1 and 3.
17.(b) $4n + 3$	B2	B1 for sight of $4n$ or $n4$ (but not $4n^k$ $k \neq 1$). Mark final answer.
18.(a) 0.26	B1	B0 for 13/50, 26/100 etc.
18.(b) $\frac{7 \times 3000}{50}$ or equivalent = 420	M1 A1	Only allow misread if 300 or 30000 used. 420/3000 gains M1A0. Mark final answer.
18.(c) $\frac{1 \times 3000}{6}$ or equivalent = 500	M1 A1	Only allow misread if 300 or 30000 used. 500/3000 gains M1A0. Mark final answer. Allow M1A0 for 480 or 510 or 498 as implying 1/6 to be 0.16 or 0.17 or 0.166.
19. (Angle DOC or exterior angle =) $\frac{360(^{\circ})}{5}$ = 72($^{\circ}$) (x =) $\frac{180 - 72}{2}$ = 54($^{\circ}$)	M1 A1 M1 A1	<i>Answers/working may be seen on diagram.</i> Sight of 72 (even x = 72) gains M1A1. FT 'their 72' (but not 60°). <i>Alternative method</i> (Sum of interior angles =) (5 - 2) × 180° or equivalent M1 = 540($^{\circ}$) A1 FT 'their interior angle sum' (≠ 900) (x =) $\frac{1}{2} \times (540 \div 5)$ M1 = 54($^{\circ}$) A1
20. (BC =) (24 - 2x7)/2 (BC =) 5(cm) (Area CDEF =) $\frac{(7 + 3) \times (9 - 5)}{2}$ or equivalent. = 20 (cm ²)	M1 A1 M1 A1	<i>Lengths may be seen on diagram.</i> A clearly shown incorrect method for finding CD is M0A0 otherwise CD=4(cm) implies this M1A1. F.T. 'their derived 5' OR F.T. $\frac{(7 + 3)}{2} \times$ 'their stated or shown length CD (<9)' Allow M1 for correct intent e.g. '7 + 3 × 4 ÷ 2' then A0. Ignore any further attempt to find total area of whole shape if area of CDEF <u>seen</u> .



GCSE MARKING SCHEME

SUMMER 2017

**GCSE (NEW)
MATHEMATICS - UNIT 1 (INTERMEDIATE)
3300U30-1**

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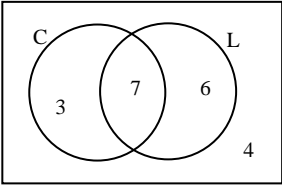
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GCSE MATHEMATICS Unit 1 : Intermediate Tier Summer 2017		✓	Mark	MARK SCHEME Comments (Page 1)
1.(a)	1 and -5		B2	B1 for 1. B1 F.T. for 'their 1' – 6.
1.(b)	- 6 + 70 = 64		B1 B1	B1 for sight of - 6 OR 70 (but not -70). B0 for -6x + 70y. C.A.O. Mark final answer.
1.(c)	6k – 5m		B2	Must be an expression for B2. B1 for sight of (+)6k OR sight of – 5m. B1 for 6k + – 5m. Mark final answer.
2.	Showing (0.4), 0.15 and 0.35 OR 40% , (15%) and 35% OR 8/20, 3/20 and (7/20) OR three correct calculations for a common amount. 15% 7/20 0.4 in order		B2 B1 3	B2 for all correct decimals, OR all correct %, OR all correct fractions <u>with a common denominator</u> , OR correct work using a common amount, OR a valid combination that allows full comparison. B1 for one correct conversion that still allows a <u>full comparison</u> . (i.e. allow one error in attempt at common format.) Allow any unambiguous indication. F.T. 'their work' if at least B1 gained. Unsupported correct answer gains B1 only.
3.(a)	Correct reflection.		B1	B0 if additional shapes.
3.(b)	Correct enlargement.		B2	<u>Use overlay.</u> Allow any orientation. B1 for one side correctly enlarged. SC1 for an enlargement by a factor of 2 or 4.
3.(c)	Correct translation.		B1	
4.(a)	1/6		B1	
4.(b)	10		B1	
4.(c)	6 blue 6 yellow 3 pink		B1	
5.	(Team A) 12 (Team B) 3		B2	B1 for values that satisfy $A - B = 9$ OR $A = 4 \times B$. e.g. final working line of 10 and 1 (or 8 and 2) would be awarded B1 if not contradicted in the answer space. SC1 for reversed answer $A = 3$ and $B = 12$.
6(a)	(David – Hr Jane – Rh Mary – P) David – Hr Jane – P Mary – Rh David – Rh Jane – Hr Mary – P David – Rh Jane – P Mary – Hr David – P Jane – Hr Mary – Rh David – P Jane – Rh Mary – Hr		B2	Allow any unambiguous notation e.g. 'DH'. For all other 5 different combinations. Do not penalise repeats. B1 for 3 or 4 other <u>different</u> combinations. B0 otherwise.
6.(b)	$\frac{4}{6}$ or equivalent. ISW		B2	2/3 or 4/6 gains B2 regardless of their list. B1 for $x/6$ ($x < 6$) OR $4/y$ ($y > 4$) F.T. 'their list' (using <u>different</u> combinations) if at least 4 to choose from for B2 or B1 as appropriate.

GCSE MATHEMATICS Unit 1 : Intermediate Tier Summer 2017	✓	Mark	MARK SCHEME Comments (Page 2)
7(a). $x + 2x + 3x + 90 = 360$ or equivalent. $\begin{array}{r} 6x = 270 \\ x = \frac{270}{6} \\ = 45 \end{array}$	✓ ✓ ✓ ✓	M1 A1 A1 A1	Allow M1 for attempting sum of $a + b + c + 90$ with ratio $a:b:c = 1:2:3$ and <u>clearly</u> using trial and improvement to aim for a total of 360. F.T. from $ax = b$. Allow SC2 for an answer of 15 (from ' $= 180$ ')
7(b) Correct use of $2x = 90(^{\circ})$ 'Yes' AND correct justification. e.g. 'Yes because of interior angles', 'Yes as lines are perpendicular to the base' 'Both A and B are 90° '.		B1 E1	F.T. 'their value of x '. Must be used in justification. Dependent on B1 with F.T. justification. <u>Alternative method for the B1 mark</u> Use of $3x = 135(^{\circ})$ AND $x = 45(^{\circ})$
8(a) $\frac{40 \times 30}{200}$ OR $\frac{41 \times 30}{200}$ $= 6$ OR 6.15 or 6		M1 A1	Unsupported answer (M0) is also A0.
8.(b) (i) 454 680		B1	
8.(b) (ii) 842		B1	
8.(b) (iii) 5.4		B1	
9. (Use of area of PBCQ $= 52 - 20 (= 32 \text{ cm}^2)$ (Area of PBCQ $= 8 \times f = 32$ $f = 4$ (Area of APQD $= 4 \times g = 20$ $g = 5$	✓ ✓ ✓ ✓ ✓ ✓ ✓	B1 M1 A1 M1 A1 OC1 W1	Answers /working may be seen on diagram. F.T. 'their derived 32' but not 52 [B1M1 implied by $8f = 32$] C.A.O. (implies B1M1A1) F.T. 'their f '. <u>Alternative method</u> $f \times (g + 8) = 52$ M1 $[fg + 8f = 52]$ $fg = 20$ M1 $[M2 \text{ implied by } 20 + 8f = 52 \text{ or } 8f = 32]$ $f = 4$ A1 C.A.O. $4 \times g = 20$ M1 FT 'their f '. $g = 5$ A1

GCSE MATHEMATICS Unit 1 : Intermediate Tier Summer 2017		✓	Mark	MARK SCHEME Comments (Page 3)
10.(a)	$1 - (0.4 + 0.25 + 0.2)$ $= 0.15$ or equivalent.		M1 A1	
10.(b)	$0.25 + 0.2$ $= 0.45$ or equivalent.		M1 A1	
10.(c)	0.4×0.4 $= 0.16$ or equivalent.		M1 A1	
11.(a)	-4		B1	
11.(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').
11.(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'.
12.(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.
12.(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'.
13.(a)	$y = -x + 2$		B1	
13.(b)	(2, 5)		B1	
13.(c)	$\frac{2}{3}$		B1	

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14.	7		B3	B2 for 5. B1 for 4 or 6 or 8 or 9 If no marks awarded allow SC1 for 11 or 13 or 17.
15.	(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.
16.(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.
16.(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.
17.	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'.
18.	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 .
19.	$4n - 8 > n + 17$ $3n > 25$ $n > 25/3$ (least value of $n =$) 9	✓ ✓ ✓ ✓ ✓	B2 B1 B1 B1	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. 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)'.



GCSE MARKING SCHEME

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3300U40-1**

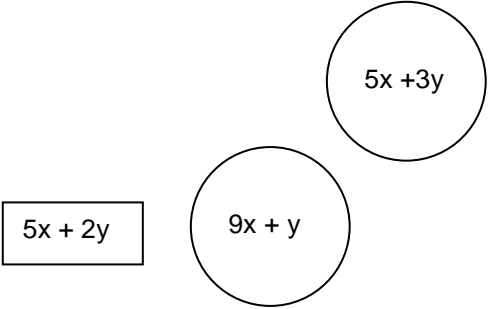
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1.(a)	$0.39 \times (\pounds)576$ or equivalent $= (\pounds)224.64$ ISW		M1 A1	Do not accept approximating e.g. $10\% = \pounds58$ etc. Allow $\pounds224.64p$ and $22464p$ but not 22464 .
1.(b)	43		B2	B1 for sight of $42.8(\dots)$ or 42.9 or $42\frac{6}{7}$ or $300/7$. Allow SC1 for 42. B0 for $300 \div 7$.
1.(c)	40		B1	Accept embedded answers e.g. $0.25 \times 40 = 10$.
1.(d)	$\frac{1}{12}$ or equivalent fraction		B1	Mark final answer. B0 for $\frac{0.5}{6}$, $0.083\ldots$ etc.
1.(e)	$\frac{10}{12}$		B1	
2.	TRUE FALSE TRUE TRUE FALSE		B3	For all 5 correct. B2 for 4 correct. B1 for 3 correct.
3.	$(7 \times 3 =)$ 21		B2	B1 for sight of $7 \times a$ (or $a \times 7$) OR $b \times 3$ (or $3 \times b$) OR 7 OR 3 unambiguously identified.
4.(a)	5		B1	Allow unambiguous indication of an answer of 5.
4.(b)	$3(n + 7)$ or $3 \times (n + 7)$ or $(n + 7)3$ or $(n + 7) \times 3$ or $3n + 21$		B2	B1 for $n + 7 \times 3$ OR $3 \times n + 7$ (bracket omitted). Penalise -1 any further incorrect work, e.g. ' $(n + 7) \times 3 = n + 21$ ' is $B2 - 1 = B1$, ' $n + 7 \times 3 = n + 21$ ' is $B1 - 1 = B0$, ' $3 \times n + 7 = 3n + 7$ ' is $B1 - 1 = B0$.
5.	8, 15 and 16 OR 9, 13 and 17 OR 10, 11 and 18.		B2	All three numbers must be less than 25. B1 for three numbers with a range of 8. B1 for three numbers whose total = 39.
6.(a)	-3, -1 and 1		B2	B1 for any two correct in the correct positions OR B1 for -5, -3 and -1 OR B1 for -1, 1 and 3.
6.(b)	$4n + 3$		B2	B1 for sight of $4n$ or $n4$ (but not $4n^k$ $k \neq 1$). Mark final answer.
7.(a)	0.26		B1	B0 for $13/50$, $26/100$ etc.
7.(b)	$\frac{7}{50} \times 3000$ or equivalent $= 420$		M1 A1	Only allow misread if 300 or 30000 used. 420/3000 gains M1A0. Mark final answer.
7.(c)	$\frac{1}{6} \times 3000$ or equivalent $= 500$		M1 A1	Only allow misread if 300 or 30000 used. 500/3000 gains M1A0. Mark final answer. Allow M1A0 for 480 or 510 or 498 as implying $1/6$ to be 0.16 or 0.17 or 0.166.

GCSE MATHEMATICS Unit 2 : Intermediate Tier Summer 2017	✓	Mark	MARK SCHEME Comments (Page 2)
8. (Angle DOC or exterior angle \Rightarrow) $\frac{360(^{\circ})}{5}$ $= 72(^{\circ})$ $(x \Rightarrow) \frac{180 - 72}{2}$ $= 54(^{\circ})$	✓ ✓ ✓ ✓	M1 A1 M1 A1	<i>Answers/working may be seen on diagram.</i> Sight of 72 (even $x = 72$) gains M1A1. FT 'their 72' (but not 60°). <u>Alternative method</u> (Sum of interior angles \Rightarrow) $(5 - 2) \times 180^{\circ}$ or equivalent M1 $= 540(^{\circ})$ A1 FT 'their interior angle sum' ($\neq 900$) $(x \Rightarrow) \frac{1}{2} \times (540 \div 5)$ M1 $= 54(^{\circ})$ A1
9. 		B3	B1 for $5x + 3y$ B1 for $5x + 2y$ Bottom circle F.T. 'their $5x + 2y$ ' + $4x - y$ for B1. Penalise 'correct' but unsimplified expressions – 1 once only.
10. (BC \Rightarrow) $(24 - 2 \times 7)/2$ (BC \Rightarrow) 5(cm) (Area CDEF \Rightarrow) $\frac{(7 + 3) \times (9 - 5)}{2}$ or equivalent. $= 20 \text{ (cm}^2\text{)}$ Organisation and Communication. Accuracy of writing.	✓ ✓ ✓ ✓ ✓ ✓	M1 A1 M1 A1 OC1 W1	<i>Lengths may be seen on diagram.</i> A clearly shown incorrect method for finding CD is M0A0 otherwise $CD = 4$ (cm) implies this M1A1. F.T. 'their derived 5' OR F.T. $\frac{(7 + 3) \times \text{'their stated or shown length CD (<9)'}}{2}$ Allow M1 for correct intent e.g. ' $7 + 3 \times 4 \div 2$ ' then A0. Ignore any further attempt to find total area of whole shape if area of CDEF <u>seen</u> . 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 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 2 : Intermediate Tier Summer 2017		✓	Mark	MARK SCHEME Comments (Page 3)																																																	
11.(a)	25.1		B2	B1 for 25(.....).																																																	
11.(b)	-14.3		B2	B1 for 14.3 OR -14.2(.....)																																																	
12.	$3x - 2 + 2x + 1 + 5x - 9 = 180$ $10x = 190$ $x = 19$ Substituting $x = 19$ into at least one expression. ($3x - 2 =$) 55(°) ($2x + 1 =$) 39(°) ($5x - 9 =$) 86(°) (So not a right-angled triangle)	✓ ✓ ✓ ✓ ✓	M1 A1 A1 M1 A1	F.T. from $ax = b$. Allow all 3 marks for $x = 19$. If $x \neq 19$ F.T. 'their <u>derived</u> value of x '. F.T. for this A1 if $x \geq 2$. Any two of these expressions correctly evaluated with no incorrect evaluation, provided the sum of the two found is > 90 . (statement not required)																																																	
13.	 One correct evaluation $3 \leq x \leq 4$ 2 correct evaluations $3.65 \leq x \leq 3.85$, one < 0 , one > 0 . 2 correct evaluations $3.65 \leq x \leq 3.75$, one < 0 , one > 0 . $x = 3.7$	✓ ✓ ✓ ✓	B1 B1 M1 A1	<i>Correct evaluation regarded as enough to identify if negative or positive. Evaluations can be rounded or truncated. If evaluations not seen condone 'too high' or 'too low'.</i> <i>Look out for testing for $x^3 - 2x = 45$.</i> <table><tr><td>x</td><td>$x^3 - 2x - 45$</td><td></td><td></td></tr><tr><td>3</td><td>-24</td><td></td><td></td></tr><tr><td>3.1</td><td>-21.409</td><td></td><td></td></tr><tr><td>3.2</td><td>-18.632</td><td></td><td></td></tr><tr><td>3.3</td><td>-15.663</td><td></td><td></td></tr><tr><td>3.4</td><td>-12.496</td><td></td><td></td></tr><tr><td>3.5</td><td>-9.125</td><td>3.55</td><td>-7.361...</td></tr><tr><td>3.6</td><td>-5.544</td><td>3.65</td><td>-3.672...</td></tr><tr><td>3.7</td><td>-1.747</td><td>3.74</td><td>-0.166...</td></tr><tr><td>3.8</td><td>2.272</td><td>3.75</td><td>0.234...</td></tr><tr><td>3.9</td><td>6.519</td><td>3.85</td><td>4.366...</td></tr><tr><td>4</td><td>11</td><td></td><td></td></tr></table> Mark final answer.		x	$x^3 - 2x - 45$			3	-24			3.1	-21.409			3.2	-18.632			3.3	-15.663			3.4	-12.496			3.5	-9.125	3.55	-7.361...	3.6	-5.544	3.65	-3.672...	3.7	-1.747	3.74	-0.166...	3.8	2.272	3.75	0.234...	3.9	6.519	3.85	4.366...	4	11		
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14.	$16.9^2 = 6.5^2 + MN^2$ or equivalent. (MN^2) = 243.36 or (MN) = $\sqrt{243.36}$ ($MN =$) 15.6(cm)		M1 A1 A1	Allow M1 for $16.9^2 - 6.5^2$. C.A.O.																																																	
15.	Correct construction of 90° at point B. Correct construction of angle BAC = 60°.		B2 B1	With sight of <u>accurate 'method arcs'</u> . e.g . (i) AB extended with arcs either side of B on extended line AB (or line AB extended by 7cm) AND arcs above or below point B). (ii) construction of 60°, 120° and a bisection. B1 for complete method but line not drawn. With sight of accurate 'method arcs' and line drawn. If <u>all three</u> marks gained but triangle not completed penalise -1 mark. (Treat reversal of angles as a misread.)																																																	

GCSE MATHEMATICS Unit 2 : Intermediate Tier Summer 2017		✓	Mark	MARK SCHEME Comments (Page 4)
16.	$\frac{QR}{18} = \tan 24(^{\circ})$ $QR = 18 \times \tan 24(^{\circ})$ $= 8(01..)(\text{cm})$		M1 m1 A1 3	OR $\frac{QR}{\sin 24} = \frac{18}{\sin 66}$ $QR = \frac{18 \times \sin 24}{\sin 66}$ C.A.O.
17.(a)	0.3(0) on 'box C branch'.		B1	
17.(b)	Sight of 0.45×0.7 OR 0.25×0.4 OR 0.3×0.8 $0.45 \times 0.7 + 0.25 \times 0.4 + 0.3 \times 0.8$ $(0.315 + 0.1 + 0.24)$ $= 0.655$ or $131/200$ or equivalent ISW		B1 M1 A1	FT 'their 0.3' from box C branch, only if, between 0 and 1. Provided less than 1.
17.(c)	$\frac{1}{3}$		B1	F.T. for the fraction that is the nearest to 1- 'their 0.655' provided $0 < \text{'their 0.655'} < 1$ Correct answer of $1/3$ gains B1 regardless.
18.(a)	$x(x^2 - 5)$		B1	
18.(b)	$2x^2 + 5x - 12$		B2	B1 for $2x^2 + kx - 12$ OR $2x^2 + 5x + k$
18.(c)	$(x - 7)(x + 4)$ ISW		B2	B1 for $(x \dots 7)(x \dots 4)$.
19.(a)	$3y = 2x + 7$		B1	
19.(b)	$y = \frac{-x}{5} + 3$		B1	
20.	$360 - 2 \times 37$ $= 286(^{\circ})$		M1 A1	SC1 for sight of $74(^{\circ})$.
21.	$\frac{BD \times 5}{2} = 35$ $BD = 14(\text{cm})$ $\cos x = \frac{14}{32}$ $x = \cos^{-1} 0.4375$ $x = 64(^{\circ})$	✓ ✓ ✓ ✓	M1 A1 M1 m1 A1	May be seen on the diagram. <u>Note</u> : If they state that $AB = 14\text{cm}$, or indicate on the diagram that $AB = 14\text{cm}$ then it is M0A0 as an incorrect method used for area of a right-angled triangle (however an unattached 14cm has to be given the benefit of the doubt and be awarded M1A1). FT 'their stated or shown length BD'. FT has to use 'their BD' (not CD). Accept answer rounded or truncated. [e.g. if their $BD = 7$, then accept $77(36\dots^{\circ})$]



GCSE MARKING SCHEME

SUMMER 2017

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

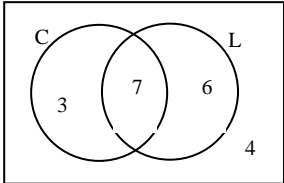
INTRODUCTION

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 $\pm \frac{1}{2}$ 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) $x = 0.37272\ldots$ AND $100x = 37.2727\ldots$ 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> $0.3 + 0.0727272\ldots = 3/10 + 72/990$ 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> $\text{Sight of } \sqrt{63} = 3\sqrt{7}$ 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°		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.



GCSE MARKING SCHEME

SUMMER 2017

**GCSE (NEW)
MATHEMATICS - UNIT 2 (HIGHER)
3300U60-1**

INTRODUCTION

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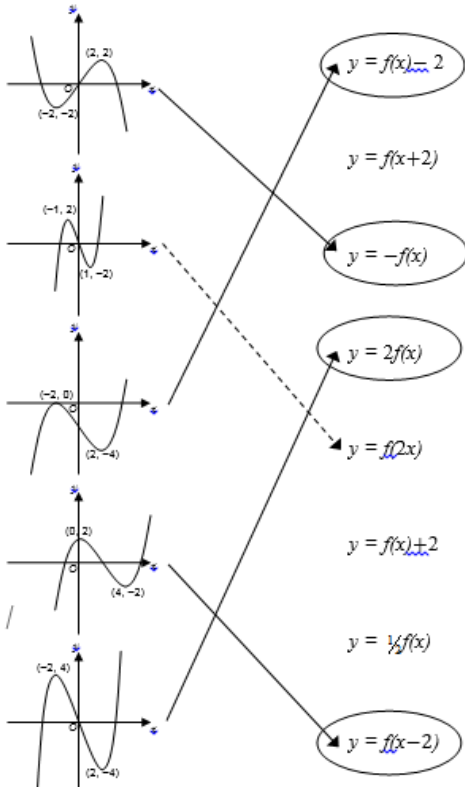
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1.(b)	-14.3		B2	B1 for 14.3 OR -14.2(.....)																																																	
2.	$3x - 2 + 2x + 1 + 5x - 9 = 180$ $10x = 190$ $x = 19$ Substituting $x = 19$ into at least one expression. ($3x - 2 =$) 55(°) ($2x + 1 =$) 39(°) ($5x - 9 =$) 86(°) (So not a right-angled triangle)	✓ ✓ ✓ ✓ ✓	M1 A1 A1 M1 A1	F.T. from $ax = b$. Allow all 3 marks for $x = 19$. If $x \neq 19$ F.T. 'their <u>derived</u> value of x '. F.T. for this A1 if $x \geq 2$. Any two of these expressions correctly evaluated with no incorrect evaluation, provided the sum of the two found is > 90 . (statement not required)																																																	
3.	 One correct evaluation $3 \leq x \leq 4$ 2 correct evaluations $3.65 \leq x \leq 3.85$, one < 0 , one > 0 . 2 correct evaluations $3.65 \leq x \leq 3.75$, one < 0 , one > 0 . $x = 3.7$	✓ ✓ ✓ ✓	B1 B1 M1 A1	<i>Correct evaluation regarded as enough to identify if negative or positive. Evaluations can be rounded or truncated. If evaluations not seen condone 'too high' or 'too low'.</i> <i>Look out for testing for $x^3 - 2x = 45$.</i> <table><tr><td><u>x</u></td><td><u>$x^3 - 2x - 45$</u></td><td></td><td></td></tr><tr><td>3</td><td>-24</td><td></td><td></td></tr><tr><td>3.1</td><td>-21.409</td><td></td><td></td></tr><tr><td>3.2</td><td>-18.632</td><td></td><td></td></tr><tr><td>3.3</td><td>-15.663</td><td></td><td></td></tr><tr><td>3.4</td><td>-12.496</td><td></td><td></td></tr><tr><td>3.5</td><td>-9.125</td><td>3.55</td><td>-7.361...</td></tr><tr><td>3.6</td><td>-5.544</td><td>3.65</td><td>-3.672...</td></tr><tr><td>3.7</td><td>-1.747</td><td>3.74</td><td>-0.166...</td></tr><tr><td>3.8</td><td>2.272</td><td>3.75</td><td>0.234...</td></tr><tr><td>3.9</td><td>6.519</td><td>3.85</td><td>4.366...</td></tr><tr><td>4</td><td>11</td><td></td><td></td></tr></table> Mark final answer.		<u>x</u>	<u>$x^3 - 2x - 45$</u>			3	-24			3.1	-21.409			3.2	-18.632			3.3	-15.663			3.4	-12.496			3.5	-9.125	3.55	-7.361...	3.6	-5.544	3.65	-3.672...	3.7	-1.747	3.74	-0.166...	3.8	2.272	3.75	0.234...	3.9	6.519	3.85	4.366...	4	11		
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4.	$16.9^2 = 6.5^2 + MN^2$ or equivalent. (MN^2) = 243.36 or (MN) = $\sqrt{243.36}$ ($MN =$) 15.6(cm)		M1 A1 A1	Allow M1 for $16.9^2 - 6.5^2$. C.A.O.																																																	
5.	Correct construction of 90° at point B. Correct construction of angle BAC = 60°.		B2 B1	With sight of <u>accurate</u> 'method arcs'. e.g . (i) AB extended with arcs either side of B on extended line AB (or line AB extended by 7cm) AND arcs above or below point B). (ii) construction of 60°, 120° and a bisection. B1 for complete method but line not drawn. With sight of accurate 'method arcs' and line drawn. If <u>all three</u> marks gained but triangle not completed penalise -1 mark. (Treat reversal of angles as a misread.)																																																	
6.	$\frac{QR}{18} = \tan 24(^{\circ})$ $QR = 18 \times \tan 24(^{\circ})$ $= 8(.01..)(\text{cm})$		M1 m1 A1	OR $\frac{QR}{\sin 24} = \frac{18}{\sin 66}$ $QR = \frac{18 \times \sin 24}{\sin 66}$ C.A.O.																																																	

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7.(a)	0.3(0) on 'box C branch'.		B1	
7.(b)	Sight of 0.45×0.7 OR 0.25×0.4 OR 0.3×0.8 $0.45 \times 0.7 + 0.25 \times 0.4 + 0.3 \times 0.8$ ($0.315 + 0.1 + 0.24$) = 0.655 or 131/200 or equivalent ISW		B1 M1 A1	FT 'their 0.3' from box C branch, only if, between 0 and 1. Provided less than 1.
7.(c)	$\frac{1}{3}$		B1	F.T. for the fraction that is the nearest to 1- 'their 0.655' provided $0 < \text{'their 0.655'} < 1$ Correct answer of 1/3 gains B1 regardless.
8.(a)	$x(x^2 - 5)$		B1	
8.(b)	$2x^2 + 5x - 12$		B2	B1 for $2x^2 + kx - 12$ OR $2x^2 + 5x + k$
8.(c)	$(x - 7)(x + 4)$ ISW		B2	B1 for $(x \dots 7)(x \dots 4)$.
9.(a)	$3y = 2x + 7$		B1	
9.(b)	$y = \frac{-x}{5} + 3$		B1	
10.	$360 - 2 \times 37$ = $286(^{\circ})$		M1 A1	SC1 for sight of $74(^{\circ})$.
11.	$\frac{BD \times 5}{2} = 35$ BD = 14(cm) $\cos x = \frac{14}{32}$ $x = \cos^{-1} 0.4375$ $x = 64(^{\circ})$	✓ ✓ ✓ ✓ ✓	M1 A1 M1 m1 A1	May be seen on the diagram. <u>Note</u> : If they state that $AB = 14\text{cm}$, or indicate on the diagram that $AB = 14\text{cm}$ then it is M0A0 as an incorrect method used for area of a right-angled triangle (however an unattached 14cm has to be given the benefit of the doubt and be awarded M1A1). FT 'their stated or shown length BD'. FT has to use 'their BD' (not CD). Accept answer rounded or truncated. [e.g. if their $BD = 7$, then accept $77(^{\circ}.36\dots^{\circ})$]
Organisation and Communication.		✓	OC1	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
Accuracy of writing.		✓	W1	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 2 : Higher tier Summer 2017	✓	Mark	MARK SCHEME Comments
<p>14</p> <p>(Greatest area =) $31.5 \times 23.5 - 20.5 \times 12.5$ $(= 740.25 - 256.25)$</p> <p style="text-align: center;">$= 484 \text{ (cm}^2\text{)}$</p>		<p>M2</p> <p>A1</p>	<p>Award M1 for correct use of values $31 < l \leq 31.5$, $23 < w \leq 23.5$, $20.5 \leq l < 21$, $12.5 \leq w < 13$. OR M1 for $31.5 \times 23.5 - \text{'area of inner rectangle'}$ OR M1 for $\text{'area of outer rectangle'} - 20.5 \times 12.5$</p> <p>CAO</p> <p><u>Alternative examples for method marks</u> <i>(adding up split areas of the shaded region).</i> 1. <i>Horizontal split</i> $2 \times 31.5 \times 5.5 + 2 \times 12.5 \times 5.5$, M2 OR 2. <i>Vertical split</i> $2 \times 23.5 \times 5.5 + 2 \times 20.5 \times 5.5$, M2</p> <p>Award M1 for correct use of values $31 < l \leq 31.5$, $23 < w \leq 23.5$, $20.5 \leq l < 21$, $12.5 \leq w < 13$ and 'their 5.5' adjusted accordingly to their values.</p> <p><i>Note that the 'shaded width' need not be consistent around the inner rectangle.</i></p>
<p>15.</p> <p><u>Enlargement</u> with scale factor $-\frac{1}{2}$ and centre (7, 4)</p>		<p>B3</p>	<p><i>Penalise -1 for further incorrect steps.</i> Award B2 for reference to any two of 'Enlargement', '$-\frac{1}{2}$' and 'centre (7, 4)' either identified by coordinates or joining corresponding vertices on the grid.</p> <p>Award B1 for reference to any one of 'Enlargement', '$-\frac{1}{2}$' and 'centre (7, 4)' either identified by coordinates or joining corresponding vertices on the grid.</p> <p>SC2 awarded for the correct two step transformation from shape A to B, e.g. enlargement SF $\frac{1}{2}$ centre origin, rotation 180° about (5.25, 3) or enlargement SF $\frac{1}{2}$ and 180° rotation, (both) with centre (7.4).</p>
<p>16.(a)</p> <p>$(0.8)^3$ or equivalent $= 0.512$ or equivalent</p>		<p>M1</p> <p>A1</p>	<p>Allow $80(\%)^3$ Fractional answer: 64/125 (ISW)</p>
<p>16.(b)</p> <p>$2 \times (0.8)^2 \times 0.2$ OR equivalent $= 0.256$ or equivalent</p>		<p>M2</p> <p>A1</p>	<p>M1 for sight of $0.8^2 \times 0.2$ or for sight of 0.128. Fractional answer: 32/125 (ISW)</p>

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17. $-(\sqrt[3]{w})^5$ $-\frac{3}{5}w$ $-(\sqrt[5]{w})^3$ $\frac{1}{(\sqrt[3]{w})^3}$ $\frac{1}{(\sqrt[3]{w})^5}$		B1	
18. $x(5x - 3) = 7$ OR $7 = x(5x - 3)$ OR $5x^2 - 3x = 7$ OR $7 = 5x^2 - 3x$ $5x^2 - 3x - 7 = 0$ $x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4 \times 5 \times (-7)}}{2 \times 5}$ $= (3 \pm \sqrt{149})/10$ $x = 1.52$ with $x = -0.92$ (answers to 2dp)	✓ ✓ ✓ ✓ ✓	M1 A1 M1 A1 A1	'= 0' required, but may be implied by an attempt to use the quadratic formula or if $a = 5$, $b = -3$, $c = -7$ used in the quadratic formula. FT 'their quadratic equation' of equivalent difficulty (3 terms with at least one negative term). Allow one slip in substitution, but must be correct formula. CAO for their quadratic equation. If none of the last 3 marks awarded for solving the <u>given equation</u> or the <u>correct quadratic</u> (irrespective if any of the opening two marks awarded), and trial and improvement used, then award: SC3 for <u>both</u> correct solutions given, correct to 2 decimal places: $x = 1.52$ with $x = -0.92$, OR SC2 for <u>both</u> correct solutions given, but correct to 3 (or more) decimal places: $x = 1.520(6\dots)$ with $x = -0.920(6\dots)$ Note: no marks to be awarded for 1 correct solution from trial and improvement.
19.(a) Appropriate example: E.g. $\pi \times \pi = \pi^2$, $(1 + \sqrt{3})^2 = 4 + 2\sqrt{3}$ $(\sqrt[3]{2})^2 = \sqrt[3]{4}$ OR $2^{\frac{2}{3}}$		B1	The following can be applied if <u>sight of π</u> in the working lines or answer space: If π or 3.141... (with or without the '...') used AND either π^2 or 9.8696... (with or without the '...') seen in the answer space, this will gain the B1. However, watch out for π seen, and e.g. 3.141 and 9.8658 offered in the answer spaces. This gains B0 because 3.141^2 has been evaluated (not π^2).
19.(b) Two different irrational numbers and the correct rational number as the answer. Examples: $\sqrt{2} \times \sqrt{8} = \sqrt{16}$ (or simplified to 4) $\sqrt{12} \times \frac{1}{\sqrt{3}} = \frac{\sqrt{12}}{\sqrt{3}}$ (or simplified to 2) $\pi \times \frac{1}{\pi} = 1$ $2^{\frac{1}{2}} \times 2^{\frac{3}{2}} = 2^2$ (answer can be simplified to 4)		B1	Answers in the boxes take precedence.

<p align="center">GCSE MATHEMATICS Unit 2 : Higher tier Summer 2017</p>	✓	Mark	<p align="center">MARK SCHEME Comments</p>
<p>20.</p> 		<p align="center">B1</p> <p align="center">B1</p> <p align="center">B1</p> <p align="center">B1</p>	
<p>21. Attempt to find the base diagonal</p> <p>$[\text{'Their face diagonal'}]^2 + [\text{'Their edge'}]^2 = 20^2$</p> <p>$x^2 + x^2 + x^2 = 400$ OR $3x^2 = 400$ OR $x^2 = 400/3$ OR equivalent.</p> <p>$x = \sqrt{(400/3)}$ OR 11.5(4700538...cm)</p>	<p align="center">✓</p> <p align="center">✓</p> <p align="center">✓</p> <p align="center">✓</p>	<p align="center">S1</p> <p align="center">B1</p> <p align="center">M1</p> <p align="center">A1</p>	<p>e.g. $\text{diagonal}^2 = x^2 + x^2$ or $x^2 + x^2 = 2x^2$.</p> <p>Clear attempt at connecting their indicated face diagonal and edge of cube with the internal diagonal. This mark implies S1.</p> <p>Correct equation connecting edges and internal diagonal. This mark implies S1 B1.</p> <p>CAO</p> <p>SC2 for an answer of 11.5(...cm) from a correct trial and improvement method, OR SC2 for an unsupported 11.5(...cm)</p> <p>SC1 for two correct evaluations of $11 \leq x \leq 12$ from a correct trial and improvement method with one < 400 and one > 400.</p>