REVISE
.wales

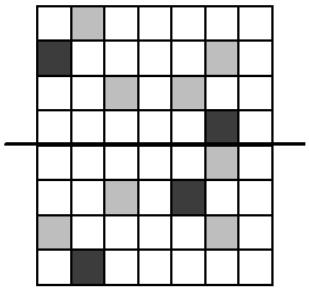
F2.17 — Coordinates from geometry; symmetry & transformations

Mark schemes for the F2.17 question pack

Spec 3.8.1, 3.8.2, 3.8.3, 3.8.4, 3.8.5, 3.8.6 — Unit 2

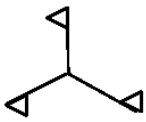
SOLUTIONS · 2025 SPECIFICATION

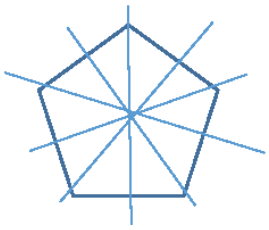
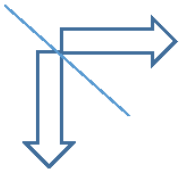
Mark schemes for the 39 questions in the corresponding revise.wales question pack (100 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

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

			3	Unsupported correct answer gains B1 only.
3.(a)	Correct reflection.		B1	B0 if additional shapes.
3.(b)	Correct enlargement.		B2	**Use overlay.** 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	

			or three different factors of 20.
5.(a)	3	B1	
(b)	Square	B1	Accept regular quadrilateral

			allow SC1 for q = 22·3
2.(a)	Two dots placed at suitable points to ensure rotational order 2.	B1	Mark correct intention. B0 if extra dots offered.
2.(b)	Three dots placed at suitable points to ensure rotational order 3.	B1	Mark correct intention. B0 if extra dots offered.
2.(c)		B1	

3. 	B1	Intention of drawing 5 correct lines
	B1	Intention of drawing correct line

		B0 if not a whole number.
8. (EC = Side of the square =) $\frac{28}{4}$	M1	*Lengths may be seen on the diagram.*
$= 7(\text{cm})$	A1	Any side of square shown as 7(cm) is M1A1.
(Area of triangle CDE =) $\frac{7 \times DE}{2} = 35(\text{cm}^2)$	M1	FT 'their stated or shown length for EC'.
(DE =) 10(cm)	A1	
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.

				Award SC1 for an unsupported answer of 82 or 83.
11.	2, 5, 7, 7	in any order.	B3	B2 for satisfying 2 of the 3 conditions B1 for satisfying 1 of the 3 conditions Conditions to check: Mode 7, Range 5, Median 6 There must be 4 numbers written otherwise B0

18.(a) Correct reflection in y = 1.	B2	B1 for correct reflection in x = 1 OR B1 for sight of line y = 1
18.(b) Clockwise rotation of 90(°) about the origin.	B3	For all **four** components. Accept anticlockwise rotation of 270° about the origin. B2 for any three. B1 for any two. 'Origin' may be stated as e.g. (0,0) or 0 or O. Do not accept 'turn' for rotation. Allow for 'about the origin' any reference to the origin. e.g. 'in the origin', 'around the origin', 'from (0,0)' etc. If not a single transformation (e.g. 'clockwise rotation of 90 and then .....) penalise −1 mark from any marks gained. (Above example gains B2 −1 = 1 mark.)

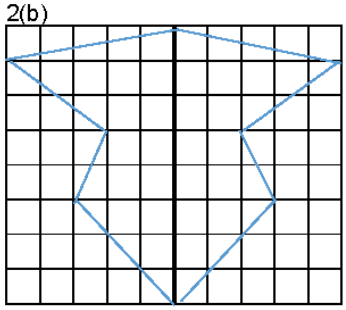
5.(a) Lines Curve	L1 C1	For all 3 straight lines. F.T. their lines, must have opposite curvature, starting at the correct place and ending at the start of their line.
5.(b) Rectangle	B1	
5.(c) Cylinder	B1	

8.(a)	a = 52° b = 52° c = 64°	B1 B1 B1	 OR FT b = 'their a'.
8.(b)	x = 64°	B1	OR FT x = 'their c'.
	y = 64°	B1	OR FT y = 180 – 52 – 'their x'. OR FT y = 180 – 64 – 'their a' OR FT y = 180 – 'their a' – 'their c' OR FT y = 180 – 'their b' – 'their c'
	Isosceles.	B1	C.A.O. Dependent on values given for <u>both</u> x and y AND two equal angles in triangle LMN AND x + y = 128.

13. 3 2	B2	B1 for each	

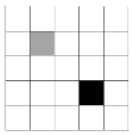
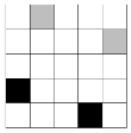
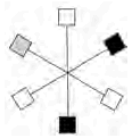
WJEC GCSE MATHEMATICS

SUMMER 2019 MARK SCHEME

GCSE MATHEMATICS Unit 1 Foundation Tier	Mark	Comments
1(a) 4523	B1	
1(b) 168	B1	
1(c) 1, 3, 9, 27	B2	B1 for 2 correct and 0 wrong OR B1 for 3 correct and 0 or 1 wrong OR B1 for 4 correct and 1 wrong
2(a) Evidence of counting squares 32 – 42 inclusive 160 – 210 (cm^2)	M1 A1 B1	 FT 'their number of squares' × 5 evaluated correctly Award 3 marks for an unsupported answer between 160 and 210 inclusive. Mark final answer
Accuracy in 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
2(b) 	B1	
3(a) an even chance	B1	
3(b) impossible	B1	
4(a) Correctly drawn tangent	B1	
4(b) Correctly drawn radius	B1	

WJEC GCSE MATHEMATICS

SUMMER 2019 MARK SCHEME

GCSE Mathematics Unit 1: Intermediate Tier	Mark	Comments
1. 23 – (4 + 2) × 3 = 5 TRUE 7/10 + 2/5 = 9/15 FALSE ½ of 1/8 = 1/4 FALSE 25% of 0·4 = 0·1 TRUE 28 – 3 × 2 + 5 = 55 FALSE	B3	For all 5 correct B2 for 4 correct. B1 for 3 correct
2.(a) Type: Yellow <100 (8), Yellow ≥100 7, Blue <100 4, Blue ≥100 6 Num.	B2	For all three correct. B1 for 1 or 2 correct. If no marks awarded allow B1 for all correct tallies seen.
2.(b) Any valid statement that indicates that the numbers (in the table) are added (to make 25). e.g. 'add the frequency'	E1	Allow 'add them up'. Allow sight of '8 + 7 + 4 + 6 (= 25).'
2.(c) $\frac{8}{25}$ or equivalent ISW	B2	B1 for x/25 with x<25. B1 for 8/y with y >8. Penalise incorrect notation −1. e.g. '8 out of 25', '8 : 25', '8 in 25'.
3.(a) 	B1	
3.(b) 	B1	
3.(c) 	B1	
4.(a) −3 1	B1 B1	OR FT 'their −3' + 4.
4.(b)(i) 21	B1	
4.(b)(ii) 191	B1	
4.(c) Divide (the previous number) by 3.	E1	Allow '÷3'. Do not accept n÷3.

WJEC GCSE MATHEMATICS

AUTUMN 2019 MARK SCHEME

GCSE MATHEMATICS Unit 2: Foundation Tier		Mark	Comments
1.	72 150 52 59 168 158	B1 B1 B1 B1	
2.(a)	(44), 88, 132, 176, 220	B1	Ignore any additional multiples
2.(b)	33	B1	
3.	> < > <	B2	For all four correct. B1 for any three correct.
4.	(Perimeter of triangle = 14 + 14 + 14) = 42 (cm) (Length of side of square =) 42 ÷ 4 = 10.5 (cm)	 B1 M1 A1	 May be implied. F.T. 'their 42' provided ≠ 14
OCW	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 • write a conclusion that draws together their results and explains what their answer means.
	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
5.	0.1(0) 10% $\frac{2}{25}$ 0.08	B4	B1 for each correct response.
6.(a)	32.16	B1	Accept $32\frac{4}{25}$ and $\frac{804}{25}$. B0 for 804 ÷ 25.
6.(b)	0.4	B1	Accept $\frac{2}{5}$. B0 for 2 ÷ 5 or $\frac{1.6}{4}$
7.(a)	trapezium	B1	
7.(b)	cuboid	B1	
7.(c)	a reflex angle	B1	
7.(d)	parallelogram	B1	
8.(a)	Point R plotted correctly	B1	
8.(b)	(-3, 2)	B1	
9.	275	B2	B1 for sight of 301.

			• use appropriate terminology, units, etc
11.(a)	1 – (0·2 + 0·3 + 0·25 + 0·15) or equivalent = 0·1 or equivalent.	M1 A1	
11.(b)	0·3 × 200 or equivalent. = 60	M1 A1	A final answer of 60/200 implies M1A0

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

	GCSE MATHEMATICS **Unit 2: Foundation Tier**	**Mark**	**Comments**
1.	1.98 53 5.88 0.41	B1 B1 B1 B1	Ignore spurious units
2.(a)	3 700 000	B1	
2.(b)	9998	B1	
2.(c)	1, 3, 5 and 15	B2	Ignore repeats. Allow 1×15 and 3×5. B1 for 2 correct factors with none incorrect, OR for 3 or 4 correct with no more than one incorrect.
3.(a)	unlikely	B1	
3.(b)	20	B1	
3.(c)	Rolling a 1 on the dice	B1	
4.(a)		B2	B1 for two correct lines with one incorrect line OR for one correct line with no incorrect lines.
4.(b)	(an) equilateral (triangle)	B1	
5.(a)	102 OR 120	B1	
5.(b)	201 OR 210	B1	
6.	Three different even numbers with a sum of 24, not including 8. Possible solutions are 2, 4 (and) 18 2, 6 (and) 16 2, 10 (and) 12 4, 6 (and) 14	B3	In any order. Allow inclusion of negative numbers. If B3 not awarded, award B2 for three numbers which sum to 24 which satisfy two of the three conditions: • The numbers are different • The numbers are even • None of the numbers is 8 If B2 not awarded, award B1 for three numbers which sum to 24.
7.(a)	0.12 or $\frac{3}{25}$. or equivalent	B1	
7.(b)	$\frac{3}{5} \times 632$ or equivalent = 379.2	M1 A1	Award M1 A0 for 1896/5 or $379\frac{1}{5}$.
7.(c)	2.5	B1	
8.	$\frac{3}{10}$ 30 $\frac{9}{(20)}$ 0.45	B1 B1 B1 B1	Accept 30/100 for 3/10

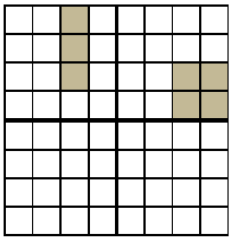
WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 1: Foundation Tier	Mark	Comments
1. (a) Angle of 35° drawn at A	B1	Accept 33° to 37° Point alone is not sufficient.
1.(b) Circle radius 7cm (diameter 14 cm)	B1	Accept radius 6.8 (cm) to 7.2 (cm)
2.(a) 5433	B1	
2.(b) 174	B1	
2.(c) 75	B1	
2.(d) 6 × 7 ÷ 2 = 21	M1 A1	If no marks, award SC1 for sight of 42.
3.(a) 600	B1	
3.(b) 4000	B1	
4.(a) D	B1	
4.(b) S	B1	
5.(a) 9	B1	
5.(b) ÷ –	B1	
6.(a) 53	B1	
6.(b) 125	B1	
7.(a) 70 (%)	B1	
7.(b) 6 sectors shaded	B1	
8. 1/3 × 180(°) OR 2/3 × 180(°) or equivalent 60(°) OR 120(°) (180 – 60 =) 120 (°) OR (180 – 120 =) 60 (°)	M1 A1 B1	 A1 for either 60(°) OR 120(°) FT 'their 60' or 'their 120'. Two angles which add to 180(°) will get this B1. If no marks award SC1 for one angle twice the size of the other.
Alternative Method *2x + x = 180 (°) or 3x = 180 (°)* *x = 60 (°)* *2x = 120 (°)*	 M1 A1 B1	 *FT 2 × 'their x' or 180 – 'their x'*
9.(a) 16g	B1	
9.(b) (y =) 9	B1	Accept embedded answers. Mark final answer.
9.(c) (w =) 30	B1	Accept embedded answers. Mark final answer.

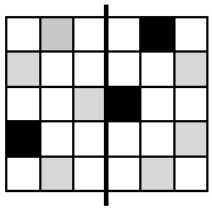
WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 2 Intermediate Tier	Mark	Comments
1.(a)(i) 16	B1	
1.(a)(ii) 2160	B2	B1 for sight of 2155(·.....) OR 2150 OR 2156. Mark final answer.
1.(b) 0·62 × 7·8 or equivalent. = 4·836 ISW	M1 A1	Unsupported 4·8.... implies M1. Accept $4\frac{209}{250}$ (ISW). Allow 1209/250 (ISW)
1.(c)(i) 247	B1	
1.(c)(ii) 2197	B1	
2.(a) 6 −5	B2	B1 for 6. B1 FT for correct evaluation of 'their 6' − 11 **only** if it leads to a negative answer.
2.(b) 15	B2	B1 for sight of 28·8 OR −13·8. Mark final answer.
3. $\frac{400}{17{\cdot}5}$ or $\frac{4}{0{\cdot}175}$. = 22·8(....) or 22·9 (Number of rods =) 22	M2 A1 B1	M1 if incorrect place value (in either length). Digits 228..... implies M1. C.A.O. FT if of equivalent difficulty. (i.e. 'their 22·8' must be greater than 1 AND their 1st decimal place number greater than or equal to 5.) Answer of 22 gains all 4 marks. Unsupported answer of 23 gains M2A0B0.
3. Alternative method (trial and improvement) *Working with a multiple of 17·5 or 0·175.* *(n × 17·5 or n × 0·175)* *22 × 17·5 (= 385) or 22 × 0·175 (= 3·85)* *23 × 17·5 (= 402·5) or 23 × 0·175 (= 4·025)* *(Number of rods =) 22*	*S1* *B1* *B1* *B1*	*Award this S1 only if* *n > 2 and n ≠ 4 and n ≠ 400.* *This implies previous S1.* *This implies previous S1 and previous B1 if 402·5 seen.* *Must be seen in answer space or unambiguously identified (not simply embedded).* *Answer of 22 gains all 4 marks.* *Unsupported answer of 23 gains S1B0B1B0.*
4.(a) **All** labels correctly inserted (Number) **1 2 3 4 5** **Red** (Colour) **Yellow** (Pink) All outcomes correctly inserted	B1 B1	Must be inserted in the table and not simply inferred from the outcomes. Accept 'R' for Red and 'Y' for Yellow. Allow 'Red' for 'R' etc. Allow '1R' for 'R1' etc.
4.(b) $\frac{2}{15}$ or equivalent ISW.	B2	*(No FT from an incorrect grid in 4a)* B1 for a numerator of 2 in a fraction < 1. B1 for a denominator of 15 in a fraction < 1. Allow B2 for 0·13... Penalise −1 for incorrect notation eg '2 out of 15', '2 : 15' etc.
5.(a) 	B2	B1 for either individual shape. Ignore clearly deleted shading.

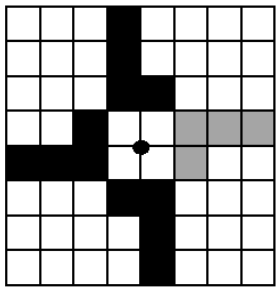
5.(b) Reflection (in the line) x = 5	B2	B1 for stating 'Reflection'. Ignore extra wording once 'reflection' (or 'reflected') seen. B1 for stating x = 5 (simply drawing the line is B0)
6.(a) 10x + 15 = 20 OR 2x + 3 = 4 10x = 5 OR 2x = 1 x = $\frac{5}{10}$ OR x = $\frac{1}{2}$ or equivalent	B1 B1 B1	FT until 2nd error. Mark final answer. Allow an embedded answer but penalise −1 if contradicted by x ≠ ½ or 0·5.
6.(b) 7(a + 3)	B1	Allow 7(1a + 3) Mark final answer.
6.(c) $5(n-3)$ or $5\times(n-3)$ or $(n-3)5$ or $(n-3)\times 5$ or $5n-15$	B2	B1 for sight of $n-3\times 5$ OR sight of $5\times n-3$. B0 for unsupported $n-15$ OR unsupported $5n-3$. Allow 'n = 5(n – 3)' etc Mark final answer.
7.(a) YES AND a valid explanation. e.g. ' the other two angles would be (both) 20(°)' e.g. diagram showing (isosceles) triangle with angles of 140°, 20° and 20°.	E1	A valid explanation implies YES circled if not otherwise contradicted (by circling NO). Explanations must engage with the specific triangle given (with an angle of 140°) and not isosceles triangles in general.
7.(b) NO AND a valid explanation. e.g. '120(°) + 30(°) ≠ 180(°)' 'the two angles add to 150(°), not 180(°) '120(°) + 30(°) + 120(°) + 30(°) ≠ 360(°)' 'the four angles add to 300(°), not 360(°)	E1	Allow 'the two angles must equal 180°'. Do not accept 'the four angles must equal 360°' unless it is made clear that the rhombus has two pairs of equal angles. A valid explanation implies NO circled if not otherwise contradicted (by circling YES).
7.(c) a + b = 150	B1	
8. [n(G ∩ S) =] 10 [n(S) =] 13	 B1 B1	Entries must be a whole numbers. [n(Ɛ)] must be 30 (i.e. no additional 'non-Spanish'). Any blank space to be taken as 0.
9. (Length of AD or BC =) 10 (cm) (Area of ABCD = 5 × 10 =) 50 (cm^2) (Area APB =) $\frac{\pi\times 5^2}{4}$ = 19·6(.....)(cm^2) (Shaded area = 50 − 19·6 =) 30·3(...) or 30·4(cm^2)	B1 B1 M1 A1 B1	May be seen on the diagram or implied in later work. FT 5 × 'their AD (or BC)'. The 50(cm^2) may be shown as two areas of 25(cm^2) for B1 B1. SC1 for sight of $\pi\times 5^2$ or equivalent (78·5....) FT 'their stated area ABCD' – 'their stated area APB' *Note: Sight of (25 – 'area of APB') + 25 implies the first two B marks. [rectangle divided in half]*
9. OCW Organisation and Communication. Accuracy of writing.	OC1 W1	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 • write a conclusion that draws together their results and explains what their answer means 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

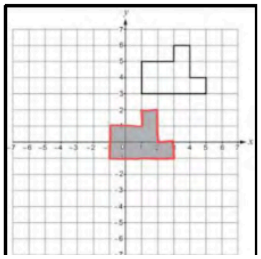
9. (Length of sides of Ivy's Cuboid B =) 3cm, 12cm, 20cm (Volume of Ivy's Cuboid =) 3 x 12 x 20 = 720 (cm^3)	B1 M1 A1	May be implied in further working. F.T. provided two of the dimensions are correct.
Alternative method *(Volume of Gareth's cuboid = 3 x 2 x 4 =) 24 (cm^3)* *(Volume of Ivy's cuboid =) 24 x 6 x 5* *= 720 (cm^3)*	*B1* *M1* *A1*	*F.T. for their stated volume for 'Gareth's cuboid'*
9. OCW Organisation and Communication Accuracy of writing	OC1 W1	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 • write a conclusion that draws together their results and explains what their answer means. 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)(i) 16	B1	
10.(a)(ii) 2160	B2	B1 for sight of 2155(·.....) OR 2150 OR 2156. Mark final answer.
10.(b) 0·62 × 7·8 or equivalent. = 4·836 ISW	M1 A1	Unsupported 4·8.... implies M1. Accept $4\frac{209}{250}$ (ISW). Allow 1209/250 (ISW)
10.(c)(i) 247	B1	
10.(c)(ii) 2197	B1	
11.(a) 6 −5	B2	B1 for 6. B1 FT for correct evaluation of 'their 6' − 11 **only** if it leads to a negative answer.
11.(b) 15	B2	B1 for sight of 28·8 OR −13·8. Mark final answer.
12. $\frac{400}{17{\cdot}5}$ or $\frac{4}{0{\cdot}175}$. = 22·8(....) or 22·9 (Number of rods =) 22	M2 A1 B1	M1 if incorrect place value (in either length). Digits 228..... implies M1. C.A.O. FT if of equivalent difficulty. (i.e. 'their 22·8' must be greater than 1 AND their 1st decimal place number greater than or equal to 5.) Answer of 22 gains all 4 marks. Unsupported answer of 23 gains M2A0B0.
12. Alternative method (trial and improvement) *Working with a multiple of 17·5 or 0·175.* *(n × 17·5 or n × 0·175)* *22 × 17·5 (= 385) or 22 × 0·175 (= 3·85)* *23 × 17·5 (= 402·5) or 23 × 0·175 (= 4·025)* *(Number of rods =) 22*	*S1* *B1* *B1* *B1*	*Award this S1 only if* *n > 2 and n ≠ 4 and n ≠ 400.* *This implies previous S1.* *This implies previous S1 and previous B1 if 402·5 seen.* *Must be seen in answer space or unambiguously identified (not simply embedded).* *Answer of 22 gains all 4 marks.* *Unsupported answer of 23 gains S1B0B1B0.*

3. 	B1	

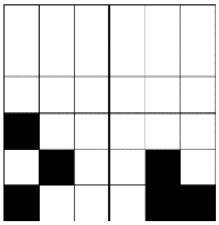
5. length = 2 × width	B1	**Answer lines take precedence** Note: correct answer 5·47…(cm) ≤ width ≤ 6·66..(cm) Must be in the correct order for B1.
Area = width × length	M1	M1 for **using** the correct method (not for stating the formula). FT 'their width' × 'their length'.
Area correctly evaluated AND > 60 (cm^2)	A1	
Perimeter = 2 × (width + length) or equivalent	M1	M1 for **using** the correct method (not for stating the formula). FT 2 × ('their width' + 'their length').
Perimeter correctly evaluated AND < 40 (cm)	A1	If answer space is left blank: • award full marks if correct length, width, area and perimeter clearly identified in working space or • penalise -1 if correct length, width, area and perimeter not clearly identified in working space. Penalise -1 if area and perimeter are reversed on the answer line but correct area and perimeter clearly identified in working space. Note: (W and L need not be whole numbers)

W	L	Area	Perimeter
6	12	72	36

9. 	B2	B1 for 3 parts correct but incorrect shape(s) also drawn OR B1 for 1 or 2 parts correct where incorrect shapes may also be drawn

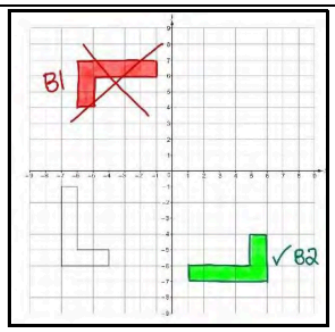
Unit 2: Intermediate Tier		Mark	Comments
1.(a)	Correct enlargement	B2	Allow correct enlargement in any orientation. B1 for three adjacent sides correctly enlarged in the same orientation. SC1 for an enlargement by a factor of 2 or 4.
1.(b)	Correct translation. 	B1	Do not award B1 for sight of a correct translation with other shapes on the grid.

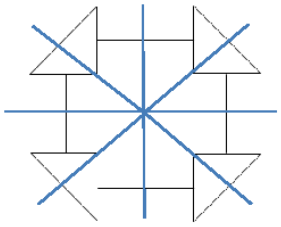
		inclusive.
8.(a) 7.29 or $\frac{729}{100}$ or $7\ \frac{29}{100}$	B1	B0 for 729 ÷ 100.
8.(b) 3.4 or $\frac{17}{5}$ or $3\ \frac{2}{5}$	B1	B0 for 17 ÷ 5.
8.(c) $\frac{60}{100} \times 28$ or equivalent = 16.8 or $\frac{84}{5}$ or $16\ \frac{4}{5}$	M1 A1	 M1 A0 for 84 ÷ 5.

13. 	B2	B1 for either correct quadrant. Ignore clearly deleted shading.

$d = 13$	B1	Strict F.T. 100 – 'their a' – their b' – 'their c'
7.(a) acute	B1	
7.(b) square	B1	

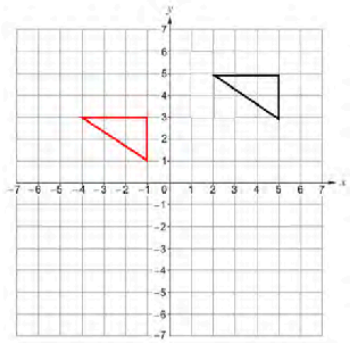
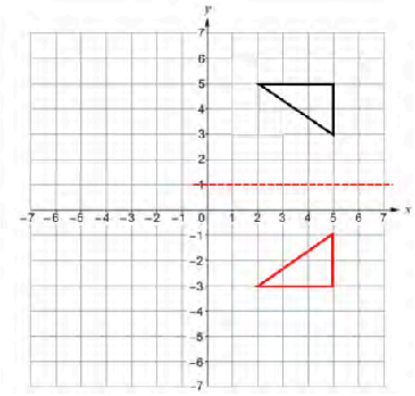
			A final answer of 0·875 is awarded B1B0.
10.	$\frac{3}{4} \times 512$ OR $512 - \frac{1}{4} \times 512$ or equivalent	M1	Award M1 for full method for calculating the OUTPUT.(Note: 512 – 128).
	$= 384$	A1	
	$\frac{3}{4} \times 384$ OR $384 - \frac{1}{4} \times 384$ or equivalent	M1	Award M1 for full method for calculating the OUTPUT.(Note: 384 – 96). FT 'their 384' if greater than 300.
	(OUTPUT =) 288 ISW	A1	FT if 'their 288' < 300, or further evaluation correctly carried out until their output < 300. If no marks gained allow SC1 for sight of 128. Award M2 for $\frac{9}{16} \times 512$ with answer of 288 is awarded A2.

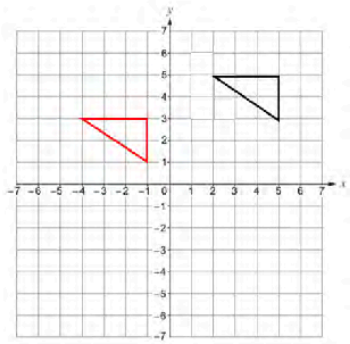
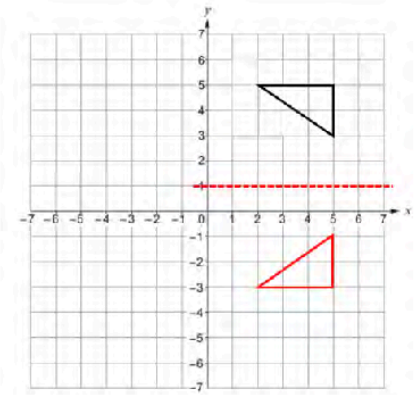
20.		B2	Award B2 for the correct rotation drawn with no other shapes drawn on the grid. Award B1 for a 90° correct clockwise rotation with either: • no other shapes drawn on the grid • the correct rotation (no others).

5.(a) 	B2	B1 for either: • 3 or 4 correct lines and no more than1 incorrect line • 2 correct lines and 0 incorrect lines
5.(b) 5	B1	

5(a) a = 54° b = 54° c = 78°	 B1 B1 B1	Answer spaces take precedence, if blank check the diagram FT 'their a' FT 132 – 'their a' or 132 – 'their b'

5(b)(i) (Number of revolutions is) $\frac{1000}{\pi \times 29 \div 12}$ or $\frac{1000 \times 12}{\pi \times 29}$ or equivalent	M3	Complete method May be seen in stages M2 for any one of the following, or equivalents: • $\pi \times 29 \div 12$ • $\frac{1000}{\pi \times 29}$ • $\frac{\pi \times 29}{1000 \times 12}$ • $\frac{1000}{\pi \times (29 \div 2) \div 12}$ • $\frac{1000}{\pi \times (2 \times 29) \div 12}$ M1 for any one of the following, that may be embedded in other working: • $29 \div 12$ (= 2.4(1666…)) • 1000×12 (= 12000) • $\pi \times 29$ (= 91.06 to 91.118) • $\frac{1000}{\pi \times n \div 12}$ where n ≠ 0, e.g. $1000 \times 12 \div (\pi \times 29^2)$ • $\frac{1000}{29 \div 12}$ (= 413.79…) • $1000 \times 12 \div 29$ (= 413.79…)
Answer in the inclusive range 131 to 132 (revolutions)	A1	CAO
5(b)(ii) (10 ×) 29 × 30 ÷ 12 or equivalent or for an answer of 72.5	M2	Allow embedded with an incorrect change of units Allow (10 ×) 2.4(16…) × 30 M1 for any one of the following: • 30 ÷ 12 (= 2.5) • 29 ÷ 12 (= 2.4166…) • sight of 2.4, 2.41, 2.416(6…) or 2.42 • sight of (1 inch =) 2.5 (cm)
725 (mm)	A1	Answer space takes precedence Allow answers in the range 720 (mm) to 726 (mm) from premature approximation, not from incorrect working
5(c) (Average speed in km/h =) $\frac{48}{1.5}$ or equivalent	M2	M1 for sight of $\frac{48}{1.3}$ or $\frac{48}{90}$ or for answers of 36.9(…) or 37 or 0.53(33...)
32 (km/h)	A1	CAO. Answer space takes precedence

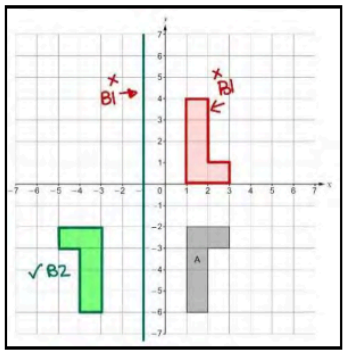
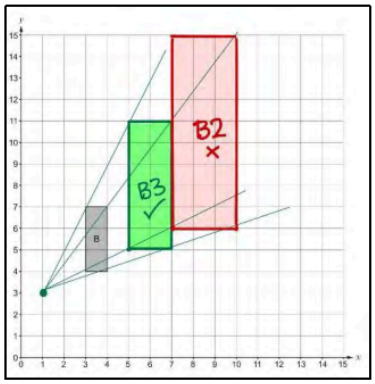
7. (a) Correct translation 	B1	
7. (b) Correct reflection in $y = 1$. 	B2	Award B1 for one of the following: • correct reflection in $x = 1$ • sight of the line $y = 1$ unambiguously indicated.

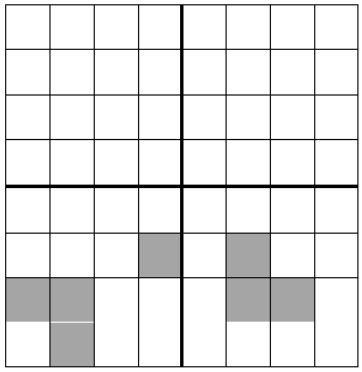
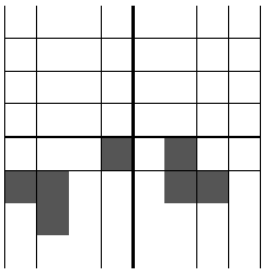
16. (a) Correct translation 	B1	
16. (b) Correct reflection in $y = 1$. 	B2	Award B1 for one of the following: • correct reflection in $x = 1$ • sight of the line $y = 1$ unambiguously indicated.

		• use appropriate terminology, units, etc.
3.(a)(i) (regular) hexagon	B1	Do not accept heptagon.
3.(a)(ii) trapezium	B1	
3.(b) cuboid	B1	
3.(c)(i) 2	B1	
3.(c)(ii) 3	B1	

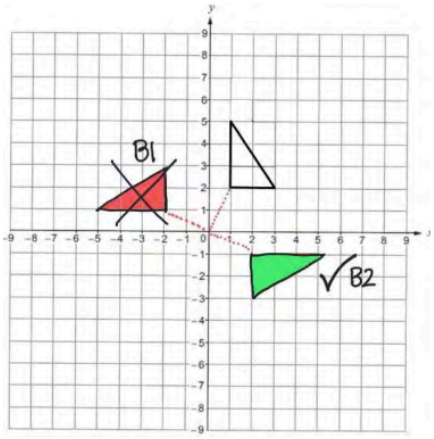
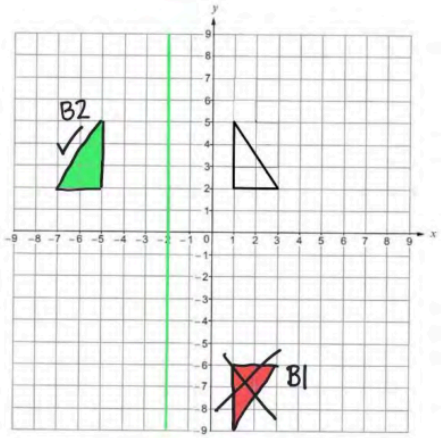
Unit 1: Intermediate Tier	Mark	Comments
8. (Probability of winning score =) $\frac{3}{20}$ or equivalent	B2	Award B2 for sight of • $\frac{1}{4}\times\frac{3}{5}$ • '3 winners out of 20' • the 3 winning combinations/scores clearly identified in a list/table of the 20 possible combinations/scores. B2 may be implied in later workings. Award B1 for one of the following: • for convincing identification of the 20 combinations/scores, for example: ✓ sight of 20 ✓ 4 × 5 ✓ showing all 20 correct combinations 10 + 1,10 + 2...with no extras ✓ all 20 correct scores listed with no extras ✓ completed sample space drawn (4 by 5) ✓ sight of $\frac{1}{4}$ AND $\frac{3}{5}$ or equivalent. • identifying the three correct possible winning scores (43, 44, 45) with no extras • identifying the three correct winning combinations (40 + 3, 40 + 4, 40 + 5) with no extras • $\frac{3}{x}$ provided $x > 3$ and correct winning combinations/scores identified • $\frac{y}{20}$ provided with $y < 20$ • $\frac{3}{20}$ from incorrect winning combinations or scores identified • <u>strict FT</u> from 'their list' provided clearly stated $\frac{\text{'their number of winning scores'}}{\text{'their total number of possibles scores'}}$
(Number of winners =) $\frac{3}{20}\times 100$ or equivalent	M1	Award M1 for $\frac{1}{4}\times\frac{3}{5}\times 100$. May be implied e.g. 100 ÷ 20 = 5, 5 × 3 = 15. FT 'their probability of winning score' × 100, provided 'their probability of winning score' < 1, or $\neq\frac{x}{100}$. M0 awarded if 'their probability of winning score' is simplified incorrectly.
= 15	A1	May be implied by '15 out of 100' or equivalent. If 15 is not seen but final answer of £15 is given (i.e. 'people' confused with 'money') then allow only M1A0. Answer must be whole number.
(Profit =) (£)100 – 15 × (£)5 OR (£)85 – 15 × (£)4	M2	FT 'their number of winners', provided ≠ 3 and <100. Award M1 for one of the following: • 15 × (£)5 • an appropriate sight of (£)75 • 'their number of winners'× (£)5 • 'their number of winners'× (£)5 evaluated correctly • (£)100 – (£)15 AND 15 × (£)4 • (£)100 – 'their number of winners' × (£)1 AND 'their number of winners' × (£)4.
= (£)25	A1	FT provided M2 (not M1M1) previously awarded. **An unsupported** answer of (£)25 is awarded B2 M1A1M2A1.

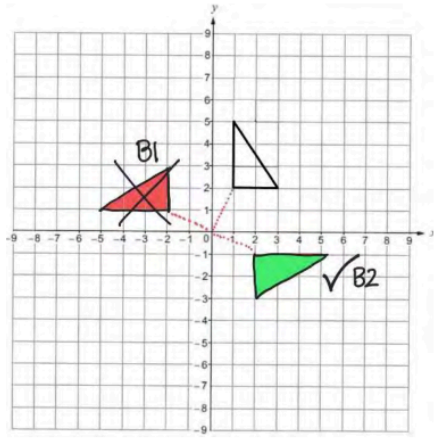
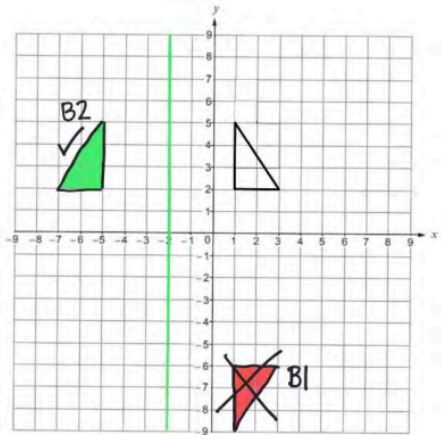
8. <u>Alternative method for the final 5 marks</u> **<u>Must clearly be working with groups of 20 throughout</u>** $20 \times (£)1 - 3 \times (£)5$	M2	Method must be seen for M2. FT 'their 20' × (£)1 – 'their 3' × (£)5.
$(£)5$	A1	May be implied in later working.
$\times \ 5$	m1	FT 100 ÷ 'their 20'
$=(£)25$	A1	

19.(a) Correct reflection.  	B2	Award B1 for one of the following: • line $x=-1$ drawn • correct reflection in line $y=-1$ • a correct reflection with only one other incorrect reflection seen.
19.(b) Correct enlargement.  	B3	Award B2 for one of the following: • an enlargement of scale factor 2 with correct orientation but not from centre (1,3) • an enlargement of scale factor 3 from centre (1,3) • 4 correct vertices plotted but not joined. Award B1 for one of the following: • an enlargement of scale factor 2 with incorrect orientation • sight of appropriate 4 'rays' from point (1,3) • an enlargement of scale factor 3 with correct orientation but not from centre (1,3) • an enlargement of scale factor 2 of one of the sides, with correct orientation, from centre (1,3). (The side must be part of a rectangle).

4. 	B3	B1 for each individual shape. Penalise −1 if **more** than 7 squares are shaded. Ignore clearly deleted shading. If no marks, award SC1 for the response below. 

8. $(6x =)$ $360 - (42 \times 6)$ $(= 108(°))$ $\div 6$ $(x =)$ $18(°)$	M2 m1 A1	Check diagram for answers. Sight of 108(°) implies M2. Award M1 for sight of 42×6 or 252(°). Award m1 only if M2 awarded. CAO. Mark final answer. Unsupported 18 is awarded M2m1A1. Allow an embedded answer but penalise -1 if contradicted by $x \neq 18$ or equivalent Award SC1 for a final answer of 30(°) or 9·4...(°) (must be clearly using rotational symmetry of order 5 or 7).
8. Alternative method 1 $360 \div 6$ $60(°)$ $(x =)$ $60 - 42$ *or* $42 + x = 60$ $18(°)$	*M1* *A1* *m1* *A1*	*Sight of 60(°) implies M1 A1* *FT 'their derived 60' – 42, provided M1 awarded and 'their derived 60' > 42.* *Unsupported 18 is awarded M1A1M1A1.* *Mark final answer.* *Allow an embedded answer but penalise -1 if contradicted by $x \neq 18$ or equivalent* *If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction.* *Award SC1 for a final answer of 30(°) or 9·4... (°) (must be clearly using rotational symmetry of order 5 or 7).*
8. Alternative method 2 $6(42 + x) = 360$ *or* $42 + x = 360 \div 6$ $252 + 6x = 360$ *or* $42 + x = 60$ $(x =)$ $18(°)$	*B2* *B1* *B1*	*Award B1 for sight of $6(42 + x)$ or $360 \div 6$* *FT from $6x = k$, if B2 B0 previously awarded.* *Mark final answer.* *Allow an embedded answer but penalise -1 if contradicted by $x \neq 18$ or equivalent* *If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction.* *Award SC1 for a final answer of 30(°) or 9·4... (°) (must be clearly using rotational symmetry of order 5 or 7).*

8.(a) Correct rotation.  	B2	Allow B1 for one of the following: • two correct vertices • a 90° anticlockwise rotation about the origin • a correct rotation with only one other incorrect rotation seen.
8.(b) Correct reflection in $x = -2$  	B2	B1 for one of the following: • line $x = -2$ drawn (do not award this B1 for one side of a triangle drawn on the undrawn line $x = -2$) • correct reflection in line $y = -2$ • a correct reflection with only one other incorrect reflection seen.

17.(a) Correct rotation.  	B2	Allow B1 for one of the following: • two correct vertices • a 90° anticlockwise rotation about the origin • a correct rotation with only one other incorrect rotation seen.
17.(b) Correct reflection in $x = -2$  	B2	B1 for one of the following: • line $x = -2$ drawn (do not award this B1 for one side of a triangle drawn on the undrawn line $x = -2$) • correct reflection in line $y = -2$ • a correct reflection with only one other incorrect reflection seen.

End of solutions