REVISE

.wales

F2.01 — Place value, rounding & directed numbers

Mark schemes for the F2.01 question pack

Spec 1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6, 1.1.8, 1.1.9 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 72 questions in the corresponding revise.wales question pack (64 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

1. (a) 50 004		B1	
1. (b) 80(p)		B2	B1 for 720(p) ÷ 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.

			Allow ± '1 small square'.
12.(a) For a method that produces 2 prime factors from the set {2, 2, 5, 5, 7} before the 2nd 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'

			Allow B1 for $5{\cdot}6 \times 10^{-}$.
19. $4n - 8 > n + 17$	✓ ✓	B2	If not B2, allow B1 for sight of $4n - 8$ AND $n + 17$ in an inequality.
$3n > 25$	✓	B1	F.T. from 'their inequality', if of equivalent difficulty.
$n > 25/3$	✓	B1	F.T. from 'their an>b' or 'their an<b' provided a≠1.
(least value of n =) 9	✓	B1	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)'.

		= 54(°) A1
20. (BC =) (24 – 2x7)/2 (BC =) 5(cm) (Area CDEF =) $\frac{(7 + 3)}{2}$ × (9 – 5) or equivalent. = 20 (cm^2)	 M1 A1 M1 A1	*Lengths may be seen on diagram.* 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. $\frac{(7 + 3)}{2}$ × '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 seen.

Unit 2: Foundation Tier Summer 2018			
1.	4.15	B1	Condone spurious units.
	4.67	B1	
	3.22	B1	

			Penalise incorrect notation (e.g. '19 in 30') −1.
12.(a)	$5x^2 - 2x - 3x^2 + 6x - 21$	B2	B1 for sight of $5x^2 - 2x$. B1 for sight of $-3x^2 + 6x - 21$. Brackets must be removed. Allow both of the above B marks even if not part of a single expression. *FT for B2 if at least two x^2 terms AND at least two x terms to be simplified.* *FT for B1 if at least two x^2 terms OR at least two x terms to be simplified.*
	$= 2x^2 + 4x - 21$	B2	If B2 not awarded, allow B1 for correct collection of 'x^2 terms' ($2x^2$) OR B1 for correct collection of 'x terms' (+4x). This 2nd B2 (or B1) is for their **final** answer. Any compensating errors leading to a 'correct' answer is B0. Penalise −1 for any attempt to equate their expression to zero (and attempting to solve) OR Incorrectly factorising.
12.(b)	$22 - f = 3 \times 6$ or equivalent. $22 - 18 = f$ OR $-f = 18 - 22$ $f = 4$	M1 A1 A1	 C.A.O. Accept 4 = f. M1A1A0 for $-f = -4$. Mark final answer. Allow all 3 marks for $\frac{22-4}{3} = 6$ with no further work. Allow 2 marks for $\frac{22-4}{3} = 6$ followed by '$f \neq 4$. If no marks gained. Allow SC1 for an unsupported $f = -4$.

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.)

2.(a)	13.25	B1	
2.(b)	sixty thousand (and) forty three	B1	
2.(c)(i)	8753	B1	
2.(c)(ii)	358	B1	

17.(a)	0·32	B1	
17.(b) (i)	600 × 0·34 = 204	M1 A1	
17.(b)(ii)	204 – 600/6 =104	M1 A1	FT 'their 204'. M1A1 for '104 out of 600' BUT M1A0 for '104/600'. FT for A1 provided answer is a positive integer.

17. (Area of square =) $40{\cdot}96(cm^2)$	B1	
(Perp. height of triangle =) $4{\cdot}3(cm)$	B1	May be seen on the diagram. Do not accept 4·3 as a 'slant height' unless used correctly for M1.
(Area of triangle =) $\frac{6{\cdot}4 \times 4{\cdot}3}{2}$	M1	F.T. 'their unambiguously stated 4·3'. (Not 10·7).
$= 13{\cdot}76(cm^2)$	A1	
(Area of ABCDE = 40·96 + 13·76 =) $54{\cdot}72(cm^2)$	B1	F.T. from two derived areas. Allow 54·7 only if 54·72 seen. *Otherwise penalise **pre**-approximation −1 once only.*

18. Sight of at least two correct different surface areas. $2 \times (35 + 5x + 7x) = 142$ or equivalent. $x = 3$	B1 M2 A1	Sight of two of $35(cm^2)$, $5x(cm^2)$, $7x(cm^2)$. Allow M1 for 'sum of at least 3 correct surface areas = 142'. C.A.O. If M0, allow SC1 for $x = 3$ with no prior equation shown.

WJEC GCSE MATHEMATICS (NEW)

SUMMER 2019 MARK SCHEME

GCSE MATHEMATICS Unit 2: Foundation Tier		Mark	Comments
1.	(£)4.67 (£)5.84 (£)7.08 (£)1.45	B1 B1 B1 B1	
2.(a)	Pentagon	B1	
2.(b)	Rhombus	B1	Allow equilateral kite, but not kite or parallelogram.
2.(c)	Cylinder	B1	Allow circular prism.
3.(a)	(47,) 94, 141	B1	Ignore additional multiples.
3.(b)	52	B1	
3.(c)	209	B1	
4.(a)	Midpoint unambiguously indicated	B1	Allow +/- 2 mm.
4.(b)	Unambiguous parallel line drawn through C	B1	Allow +/- 2°.
5.(a)	9 (and) 16	B2	Allow 3^2 (and) 4^2. B1 for a sum of two square numbers less than 30 seen in workings or two square numbers less than 30 written on the answer line.
5.(b)	Accept suitable explanations, e.g. • the sum of three even numbers will be even (and 23 is odd) • when you add any amount of even numbers the answer is always even (whilst 23 is odd). • (23 is odd, but) even + even + even = even	E1	Allow • even + even = even, • because 23 is odd.
6.	FALSE TRUE FALSE TRUE	B2	For all four correct. B1 for 3 correct.
7.(a)	60 (%)	B2	B1 for equivalent fraction or decimal (0.6, 3/5, 12/20). If B2 not awarded, F.T. their fraction (except for ½, ¼ and ¾) correctly converted to a percentage for B1.
7.(b)	Multiply by 4	E1	Accept other correct explanations e.g. divide (the number) by 5 then multiply by 20, double (the number) and double (it) again or divide by ¼.
7.(c)	Accept suitable explanations, e.g. • 0.125 (is greater than) 0.1 • 5/40 (is greater than) 4/40	E1	Award E1 for other correct explanations e.g. a larger denominator means each part of the whole is smaller, or for correct evaluation of 1/8 and 1/10 of a chosen number.
8.(a)	65 (°)	B1	Allow ±2°
8.(b)	225°	B1	
8.(c)	(Small angle = 180 ÷ 6 =) 30(°) (Large angle = 5 × Small angle =) 150 (°)	B1 B1	Check diagram, though answer space takes precedence. F.T. 'their small angle' × 5 or 180 - 'their small angle ', provided answer is less than 180°. If no marks awarded, award B1 for both correct angles given in reverse.

15.(a) 0·32	B1	
15.(b) Sample number from Anglesey on 2nd day = 3000 × 0·42 = 1260	 M1 A1	 Allow M1A1 for sight of 1260 e.g. 1260/3000
(Rel.Fqu. for two days =) $\frac{640 + 1260}{2000 + 3000}$ = 0·38	M1 A1	FT 'their 1260'.
15.(c) 'Answer to part (b)' noted AND Valid explanation e.g. 'more people sampled'	E1	Explanation must refer to the sample being the largest. Allow e.g 'from both days', 'number of people added', 'frequencies are added'. Do not accept 'relative frequencies are added'.
16.(a)(i) 425 kg	B1	
16.(a)(ii) 21·5 s	B1	
16.(a)(iii) 83 people	B1	
16(b) $2{\cdot}38 \times 10^{-2}$	B2	B1 for sight of a correct answer but not in standard form. e.g. $23{\cdot}8 \times 10^{-3}$ or 0·0238.
17.(a) 5n < 3n + 7 or equivalent ISW	B2	2n < 7 OR n < 7/2 implies B2. Ignore use of a different letter e.g. 5x < 3x + 7. Use of '≤' is B1. B1 for sight of 3n + 7 in an inequality.
17.(b) 2n < 7 OR n < 7/2 (Greatest amount =) (£)3	B1 B1	FT 'their inequality' if of equivalent difficulty. May be seen in part (a). FT 'their n < k'. B0 if they have 'n>k'. B0 if it leads to n<1 An answer of (£)3 gains B1B1 (unless from incorrect algebra work).
18.(a) 0·7 shown for 'Does not go on tour bus'. Use of 0·3 × …… = 0·24 P(sees show) = 0·8 Second set of branches 0·8, 0·2, 0·8, 0·2	B1 M1 A1 A1	 Allow M1A1 if 0·8 seen on one of the 'sees show' branches. FT 'their 0·8' **only** if M1 awarded. (0·24, 0·76, 0·24, 0·76 is M0A0A0)
18.(b) 0·7 × 0·2 = 0·14 ISW	M1 A1	FT 'their values' if both between 0 and 1.

15.(a) 0·32	B1	
15.(b) Sample number from Anglesey on 2nd day = 3000 × 0·42 = 1260	 M1 A1	 Allow M1A1 for sight of 1260 e.g. 1260/3000
(Rel.Fqu. for two days =) $\frac{640 + 1260}{2000 + 3000}$ = 0·38	M1 A1	FT 'their 1260'.
15.(c) 'Answer to part (b)' noted AND Valid explanation e.g. 'more people sampled'	E1	Explanation must refer to the sample being the largest. Allow e.g 'from both days', 'number of people added', 'frequencies are added'. Do not accept 'relative frequencies are added'.
16.(a)(i) 425 kg	B1	
16.(a)(ii) 21·5 s	B1	
16.(a)(iii) 83 people	B1	
16(b) $2{\cdot}38 \times 10^{-2}$	B2	B1 for sight of a correct answer but not in standard form. e.g. $23{\cdot}8 \times 10^{-3}$ or 0·0238.
17.(a) 5n < 3n + 7 or equivalent ISW	B2	2n < 7 OR n < 7/2 implies B2. Ignore use of a different letter e.g. 5x < 3x + 7. Use of '≤' is B1. B1 for sight of 3n + 7 in an inequality.
17.(b) 2n < 7 OR n < 7/2 (Greatest amount =) (£)3	B1 B1	FT 'their inequality' if of equivalent difficulty. May be seen in part (a). FT 'their n < k'. B0 if they have 'n>k'. B0 if it leads to n<1 An answer of (£)3 gains B1B1 (unless from incorrect algebra work).
18.(a) 0·7 shown for 'Does not go on tour bus'. Use of 0·3 × …… = 0·24 P(sees show) = 0·8 Second set of branches 0·8, 0·2, 0·8, 0·2	B1 M1 A1 A1	 Allow M1A1 if 0·8 seen on one of the 'sees show' branches. FT 'their 0·8' **only** if M1 awarded. (0·24, 0·76, 0·24, 0·76 is M0A0A0)
18.(b) 0·7 × 0·2 = 0·14 ISW	M1 A1	FT 'their values' if both between 0 and 1.

Unit 1: Intermediate Tier		
1.		
−4(°C)	B1	
Up 3(°C)	B1	Allow +3 (but not 3) for this B1.
1(°C)	B1	

17	8	R1	have incorrect place value e.g. 2497 (..) × 0·024

20.(a)		40·5 (mm)	B1	
20.(b)	(25·5 + 25·5 =)	51 (mm)	B1	
20.(c)	(11·5 + 11·5=)	23 (mm)	B1	

WJEC GCSE MATHEMATICS

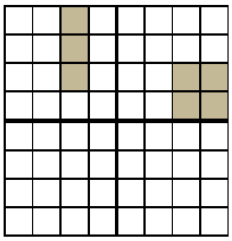
AUTUMN 2020 MARK SCHEME

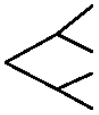
	GCSE MATHEMATICS **Unit 2: Foundation Tier**	**Mark**	**Comments**
1.	1.98 53 5.88 0.41	B1 B1 B1 B1	Ignore spurious units
2.(a)	3 700 000	B1	
2.(b)	9998	B1	
2.(c)	1, 3, 5 and 15	B2	Ignore repeats. Allow 1×15 and 3×5. B1 for 2 correct factors with none incorrect, OR for 3 or 4 correct with no more than 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

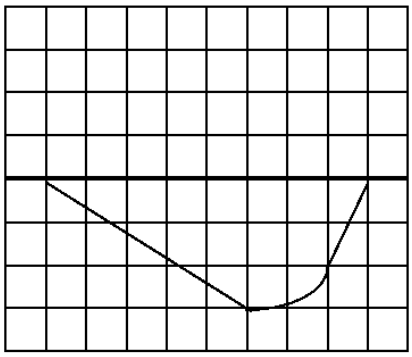
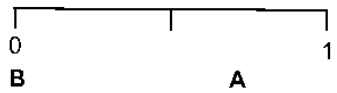
	GCSE MATHEMATICS **Unit 2: Foundation Tier**	**Mark**	**Comments**
1.	1.98 53 5.88 0.41	B1 B1 B1 B1	Ignore spurious units
2.(a)	3 700 000	B1	
2.(b)	9998	B1	
2.(c)	1, 3, 5 and 15	B2	Ignore repeats. Allow 1×15 and 3×5. B1 for 2 correct factors with none incorrect, OR for 3 or 4 correct with no more than 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

13.(a) 	B2	B1 for each individual shape. Ignore clearly deleted shading. .
13.(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)
14.(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.
14.(b) $5(n-3)$ 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.
15.(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.
15.(b) a + b = 150	B1	
16. [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.
17. (Length of AD or BC =) 10 (cm)	B1	May be seen on the diagram or implied in later work.
(Area of ABCD = 5 × 10 =) 50 (cm^2)	B1	FT 5 × 'their AD (or BC)'. The 50(cm^2) may be shown as two areas of 25(cm^2) for B1 B1.
(Area APB =) $\frac{\pi\times 5^2}{4}$	M1	
$= 19{\cdot}6(.....)(cm^2)$	A1	SC1 for sight of $\pi\times 5^2$ or equivalent (78·5….)
(Shaded area = 50 − 19·6 =) 30·3(…) or 30·4(cm^2)	B1	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]*

16.(a) $(x - 4)(x - 3)$ $(x =) 4$ AND $(x =) 3$	B2 B1	B1 for $(x \ldots 4)(x \ldots 3)$. Ignore '= 0'. Strict FT from their brackets. Allow the following. B2 for $x - 4 (=0)$ AND $x - 3 (=0)$ (B1) $(x =) 4$ AND $(x =) 3$ (B1) B1 for $x + 4 (=0)$ AND $x + 3 (=0)$ (B0) $(x =) -4$ AND $(x =) -3$ (B1) FT B1 if only $(x =) 4$ AND $(x =) 3$ seen. (B1)
16(b) $25x^2 - 20x + 4$	B2	Otherwise B1 for sight of $25x^2 \pm kx + 4$ (allow k = 0) B1 for sight of $25x^2 - 20x - 4$ Mark final answer.
17.(a) Correct framework 	B1	
Suitable labelling on both 1st pair of branches AND on both of at least one pair of 2nd set of branches. e.g. 'Car', 'No car', 'Before 8', 'After 8'. OR Titles of 'Car' and 'Before 8' with branch endings of 'Yes' and 'No'.	B1	Accept any unambiguous wording.
Correct probabilities on first pair of branches 0·7 AND 0·3 (for 'Car', 'No car') OR 0·4 AND 0·6 (for 'Before 8', 'After 8')	B1	Must be consistent with their labelling. Allow this B1 if no headings given, unless contradicted by, or inconsistent with, further labelling.
Correct probabilities on second two sets of branches 0·4 AND 0·6 correctly placed (following 0·7 and 0·3) OR 0·7 AND 0·3 correctly placed (following 0·4 and 0·6)	B1	Allow this B1 if no headings given, unless contradicted by, or inconsistent with, further labelling. Allow this B1 if only shown on one set of branches. Provided not contradicted on the other set of branches.
17.(b) $0·7 \times 0·4$ or equivalent. $= 0·28$ or equivalent.	M1 A1	No FT. M1A0 for a final answer of 0·28%. Mark final answer.
18.(a) PA = 12(cm) AND correct theorem given, e.g. 'tangents from an external point are equal in length'.	E1	Must use the words 'tangents' AND 'equal (identical / same)'. Do not accept e.g. 'PA = PB'. (E0) Accept alternative correct answers.
18.(b) PÂO = 90(°) AND correct theorem given, e.g. 'the tangent at any point on a circle is perpendicular to the radius at that point'.	E1	Must use the words 'tangent' AND 'radius (diameter)' Allow e.g. 'radius and tangent meet at 90'. (E1) Do not accept e.g. 'PA and OA meet at 90'. (E0)
18.(c) (Area PAOB =) $2 \times \frac{12 \times 4}{2}$ or equivalent. $= 48 (cm^2)$	M1 A1	OR FT 'their PA' × 4 / 2 + 12 × 4 / 2 M0 for 48×2 or $12 \times 4 \times 2$ (= 96) An unsupported final answer of 48 gains both marks. If no marks gained allow SC1 for sight of 24(cm²) OR a correct evaluation of ('their PA' × 4) / 2.
19.(a) $y = 2·5x + 3$	B1	
19.(b) $y = 3x - 5$	B1	
19.(c) Line D	B1	

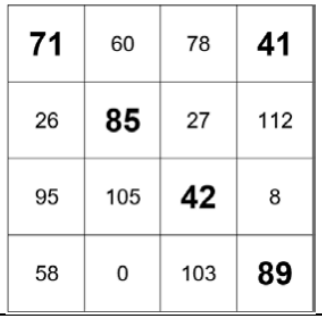
WJEC GCSE MATHEMATICS

AUTUMN 2021 MARK SCHEME

Unit 1: Foundation Tier	Mark	Comments
1.(a) Ninety-five thousand and forty-eight	B1	
1.(b) 931	B1	
1.(c) 1250	B1	
1.(d) 208	B1	
1.(e) 1,2,3,6,9,18	B2	B1 for 4 or 5 correct and 0 incorrect B1 for 5 or 6 correct and 1 incorrect Ignore repeated numbers Accept products 1×18, 2×9, 3×6
2.(a) 94 (mm)	B1	Accept 92 to 96 (mm)
2.(b) 136(°)	B1	Accept 134 to 138 (°)
3.(a) 16	B1	
3.(b) ¾	B1	Mark final answer.
3.(c) 28	B1	
4. 	B2	B1 for correct longer straight line. B1 for correct curve AND shorter straight line. The lines must pass through the correct points.
5.(a) 4.3 x 1000 4300 (g)	M1 A1	
5.(b) 3 × 100 ÷ 6 50 (cm)	M1 A1	If M0 A0, award SC1 for sight of 300(cm) or 0.5(m).
6. 	B1 B1	A should be between 0.6 and 0.8 B should be at 0

WJEC GCSE MATHEMATICS

AUTUMN 2021 MARK SCHEME

Unit 2: Foundation Tier	Mark	Comments
1.(a) 5169	B1	
1.(b) 6502	B1	
1.(c) 186	B1	
1.(d) 45	B1	
2.(a) 5, 5, 5, 5	B1	
2.(b) Exactly two 3s and any other two numbers	B1	Accept in any order.
2.(c) Exactly one 2 and any other three numbers	B1	Accept in any order.
3.(a) 40 065	B1	
3.(b) 5400	B1	
4.(a) rhombus	B1	
4.(b) equilateral triangle	B1	
5. 	B3	B2 for 3 rows or 3 columns with a total of 250. B1 for 1 or 2 rows or 1 or 2 columns with a total of 250.
6.(a) 98	B1	
6.(b) Subtract 13 (from the previous term)	B1	Accept -13, goes down in 13s, etc.
6.(c) x-2 (years old)	B1	Mark final answer.
7.(a) Sum of numbers (262) Sum of numbers ÷ 4 65.5 or equivalent	M1 m1 A1	Allow for an unsupported value between 173 and 351. Award this m1 for 'their sum' ÷ 4 CAO. Allow 131/2. If no marks awarded, allow SC1 for (64 + 89 + 83 + 26 ÷ 4 =) 242.5 or equivalent.
7.(b) (65.5 + 1 =) 66.5	B1	F.T. 'their mean' from (a). Allow 133/2.
8.(a) 23.04	B1	Accept $23\ ^{1}/_{25}$ or equivalent e.g. 576/25
8.(b) 7.9	B1	Accept $7\ ^{9}/_{10}$ or equivalent e.g. 79/10
8.(c) 0.04 × 325 or equivalent = 13 ISW	M1 A1	
9. (Oliver's number is) 90	B3	B2 for a final answer between 40 and 95 satisfying 2 of the 3 conditions. (45, 54, 60, 72) B1 for a final answer between 40 and 95 satisfying only 1 of the 3 conditions. (40, 42, 44, 46, 48, 50, 52, 56, 58, 62, 63, 64, 66, 68, 70, 74, 75, 76, 78, 80, 81, 82, 84, 86, 88, 92, 94)
OC 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

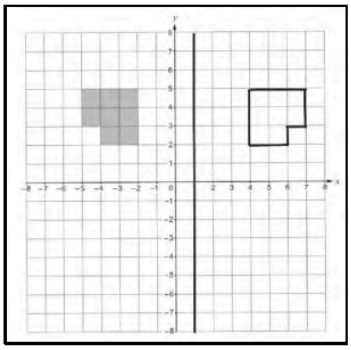
14.(a) $3k = p - 2$ or $p - 2 = 3k$ or $-3k = -p + 2$ $k = \frac{p-2}{3}$ or $\frac{p-2}{3} = k$ or $k = \frac{-p+2}{-3}$	B1 B1	F.T. only from $\pm 3k = \pm p \pm 2$, stated or implied. ($3k = p - 2$ will have already gained the previous B1.) B1B0 for $-k = \frac{-p+2}{3}$ or equivalent. Mark final answer. *Note* *Allow B1B0 for $k = (p - 2) \div 3$ with or without brackets.* *Allow B1B0 for $\frac{p-2}{3}$ ('k' missing)*
14.(b) (Midpoint =) (5, 17)	B2	B1 for each coordinate. May be given as $x = 5$ and $y = 17$. Accept use of $x = 5$ and $y = 17$ in $y = 3x + 2$. Allow B1 for sight of $\frac{3+7}{2}$ or $\frac{7-3}{2} + 3$ OR $\frac{15+19}{2}$ or $\frac{19-15}{2} + 15$ Allow SC1 for unsupported (17, 5).
Showing that $17 = 3 \times 5 + 2$ (convincing) AND 'Yes'	B1	FT 'their stated midpoint', but not (3,15) nor (7,19), with consequent calculation AND decision.
15.(a) $5{\cdot}8 \times 10^{-3}$	B1	
15.(b) 7×10^{5}	B2	B1 for sight of correct value not in standard form e.g. $0{\cdot}7 \times 10^{6}$ or 700000. Mark final answer.
16.(a) P(South Wales =) $1 - 0{\cdot}3 - 0{\cdot}25$ $= 0{\cdot}45$ AND shown on relevant branch. 0·2 and 0·8 shown on **all** relevant branches.	M1 A1 B1	
16.(b) $0{\cdot}45 \times 0{\cdot}2$ or equivalent $= 0{\cdot}09$ or equivalent	M1 A1	FT 'their completed tree diagram' for values $0<p<1$.
17. Showing $4x + 3y = 19$ or equivalent. Showing $6x - y = 12$ or equivalent. A correct method to eliminate one variable e.g. 'equal coefficients AND appropriate addition or subtraction'. OR ' method of substitution'. First variable found , $x = 2\frac{1}{2}$ or $y = 3$. Second variable found	B1 B1 M1 A1 A1	$2x + 2x + 3y = 19$ is an equivalent answer. *Workings must be shown for M1A1A1.* FT to solve for simultaneous equations if of equivalent difficulty. Allow one error in one term (not the term with equal coefficients.) C.A.O. for their equations FT substitution of their '1st variable' if M1 gained If NO (i.e. none of the five) marks gained, allow SC1 for both answers of $x = 2\frac{1}{2}$ AND $y = 3$

15. Correct strategy of √(Area ABCD – 32) (Area ABCD =) 81 (cm^2) (Area PQRS = 81 – 32 =) 49 (cm^2) (PQ = √49 =) 7 (cm)	S1 B1 B1 B1	 FT 'their stated area of ABCD' – 32. FT √'their stated area of PQRS' but not √32 or √9 A final answer of 7(cm) gains all four marks. May be seen on the diagram. (FT answers must be rounded or truncated to 1dp or more)
16.(a) 1·442	B2	B1 for sight of 1·44(1……) or 1·44(2……)
16.(b) 191	B3	B2 for sight of 190(·5…..) or 190·6 B1 for sight of 280.
17. (P(Gold) =) 1 – 0·68 – 0·22 = 0·1 22 people choose silver AND 10 people choose gold (Profit =) 100 × (£)2 – 22 × (£)3 – 10 × (£)8 = (£)54	M1 A1 B1 M1 A1	 May be seen in the table. FT 100 × 'their 0·1'. The 10 implies previous M1A1. The 22 and 10 may be seen in further work. FT 'their stated number of winners (silver and gold)'.
Alternative method1 *(P(Gold) =) 1 – 0·68 – 0·22* *= 0·1* *22 people choose silver AND 10 people choose gold* *(Profit =) 68 × (£)2 – 22 × (£)1 – 10 × (£)6* *= (£)54*	*M1* *A1* *B1* *M1* *A1*	 *May be seen in the table.* *FT 100 × 'their 0·1'. The 10 implies previous M1A1.* *The 22 and 10 may be seen in further work.* *FT 'their stated number of winners (silver and gold)'.*
Alternative method 2. *(P(Gold) =) 1 – 0·68 – 0·22* *= 0·1* *(Profit per game =)(£)2 – 0·22 × (£)3 – 0·1 × (£)8* *= (£)0·54* *(Total profit = £0·54 × 100 =) (£)54*	*M1* *A1* *M1* *A1* *B1*	 *May be seen in the table.* *FT 'their 0·1.* *FT 'their derived £0·54'.*
Alternative method 3. *(P(Gold) =) 1 – 0·68 – 0·22* *= 0·1* *(Profit per game =)0·68×(£)2 – 0·22×(£)1 – 0·1×(£)6* *= (£)0·54* *(Total profit = £0·54 × 100 =) (£)54*	*M1* *A1* *M1* *A1* *B1*	 *May be seen in the table.* *FT 'their 0·1.* *FT 'their derived £0·54'.*

16.(a) N ÷ 1·04	B1	
16.(b) 248·832	B2	Allow B2 if 248·832 seen then corrected to a final answer of 249 or 248·8(..). If B2 not awarded, B1 for final answer of 249 or 248·(…) i.e. 248·832 not seen. B1 for sight of $100 \times 1{\cdot}2^5$ or for equivalent calculations, e.g. $144 \times 1{\cdot}2^3$ or 100×1·2×1·2×1·2×1·2×1·2 (may be seen in stages) B1 for a final answer of 298·5984.
17. (x – 6)(x + 2) (x =) 6 AND (x =) −2	B2 B1	B1 for (*x* ... 6)(*x* ... 2). Strict F.T. from their brackets. Penalise change of letter −1. Allow the following. B2 for x − 6 (=0) AND x + 2 (=0) (B1) (x =) 6 AND (x =) −2 (B1) B1 for x + 6 (=0) AND x − 2 (=0) (B0) (x =) −6 AND (x =) 2 (B1) FT B1 if only (x =) 6 AND (x =) −2 seen. (B1) Use of quadratic formula would only lead to this B1. Mark final answer.

14. Sight of 9 AND 49 n + 9 = 49 (n =) 40	B1 M1 A1	 Any unambiguous indication that this linear relationship is being considered (including 'trial and improvement'). FT their $\sqrt{81}$ (≠81) AND 7^2 (≠7) for M1 and possibly A1 if at least one correct value used. FT for M1 only if neither correct value used. Award M1 if 49 – 9 seen. Mark final answer.
15. Indicates 2 (letters out of 6 gain points) (Expected number of wins =) $\frac{2}{6} \times 24$ or equivalent = 8 (Points gained =) 8 × 10 = 80 (points) AND 'No' (Leah is not expected score 100 points)	B1 M1 A1 M1 A1	Any unambiguous indication. FT 'their stated number of '10 point' letters'. Award M1A1 for 8/24 suggesting '8 wins out of 24' FT 'their derived 8' × 10 only if 'their derived 8' < 24. FT their derived number of points
Alternative method 1 *Indicates 2 (letters out of 6 gain points)* *(Each letter expected to be drawn) $\frac{24}{6}$ (times)* *= 4 (times)* *(Points gained =) 4 × 2 × 10* *= 80 (points) AND* *'No' (Leah is not expected score 100 points)*	*B1* *M1* *A1* *M1* *A1*	*Any unambiguous indication.* *FT 'their derived 4' and 'their stated 2'.* *FT their derived number of points.*
Alternative method 2 *Indicates 2 (letters out of 6 gain points)* *(Expected number of wins =) $\frac{2}{6} \times 24$ or equivalent* *= 8* *(Number of wins required =) $\frac{100}{10}$* *= 10 (wins) AND* *'No' (Leah is not expected score 100 points)*	*B1* *M1* *A1* *M1* *A1*	*Any unambiguous indication.* *FT 'their stated number of '10 point' letters'.* *Award M1A1 for 8/24 suggesting '8 wins out of 24'* *FT their derived number of expected wins.* *Note for Alternative method 2* *If 'number of wins required' is calculated before calculating 'number of expected wins' then the conclusion ('AND') will be attached to the 8 rather than the 10.*
16. 4x + 5 = 57 or equivalent 4x = 52 x = 13	M1 A1 A1	 FT from 4x = k. Accept x = k/4 (but, if on FT k is a multiple of 4, final answer must be given as a whole number.) M1A1A0 for 'x = 52/4' Mark final answer. Allow (M1)A1A1 for a correct embedded answer BUT only (M1)A1A0 if contradicted by x ≠ 13.
17. 3, 4, 4, 9 OR 3, 3, 5, 9.	B3	B1 for a range = 6. B1 for a total = 20. B1 for a median = 4. Penalise use of negative or non-integer values −1. FOUR numbers must be shown, otherwise B0.
18. Use of Distance / Time $\frac{100}{2{\cdot}5}$ or equivalent = 40 (mph)	M1 M1 A1	Allow M1 even for e.g. 100 / 2·3(0) or 100/150. C.A.O.

4.(c) 39	B1	
5.(a) 16 and 25	B2	Answer space takes precedence. Accept 4^2 and 5^2. B1 for writing • two numbers with a difference of 9, one of which is square, or • two different square numbers in their answer space, or • listing at least three square numbers in their workings. If no marks, award SC1 for an unsupported answer of 4 and 5.
5.(b) No, AND correct reason stated e.g. • (two odd numbers) add to give an even number (and 37 is odd). • only an even and an odd number can add to make 37. • only an even and an odd number can add to make an odd number.	E1	E0 if incorrect box is ticked, even if the correct reason is given. If none of the boxes are ticked, 'no' may be implied by their reason. Accept equivalent reasons. Accept the use of 'make' or 'and' instead of 'add'. Allow 'there are no two odd numbers which add to make 37' or 'the answer will always be even'. Exemplifying two odd numbers adding to an even number by itself is insufficient.

16.	Correct reflection in $x = 1$. 	B2	B1 for correct reflection in $y = 1$ OR B1 for sight of line $x = 1$ (must be unambiguous)

= 84 (m^2)		
19. 7, 7, 10, 12 (in any order)	B3	*Numbers shown **in** number boxes take precedence.* The four conditions: • All numbers between 1 and 15 inclusive. • **Unique** mode = 7. • Median = 8·5. • Total = 36. B2 for three conditions met. B1 for two conditions met. FOUR numbers must be shown, otherwise B0. Award B1 only for 7, 7,10,10 OR 7, 7,11,11 (not a unique mode).

2(a) one hundred and ninety-five thousand	B1	Do not accept • one hundred thousand and ninety-five thousand • 195 thousand
2(b) Caernarfon Castle	B1	Allow (+)0.2(%) as indication of Caernarfon Castle
2(c) 255949 + 260153 516 102	M1 A1	
2(d) 452 007 – 319 131 132 876	M1 A1	Allow 319 131 – 452 007 Allow -132 876

2(e) Yes and valid reason given e.g. 'Yes, because 455 428 is nearly 500 000' 'Yes, because if you round up 455 428 to the nearest hundred thousand it is 500 000' 'Yes, as 455 428 is closer to half a million than 400 000' 'Yes, because rounding to the nearest 100 000 would give you half a million'	E1	Allow e.g. 'Yes, because they had over 450 000' 'Yes, as only about 50 000 away from half a million' 'Yes, because 455 428 is nearly half a million' 'Yes, as you would round up to the nearest 50 000' 'Yes, as half a million is 500 000' 'No because it is nearly 45 000 short' 'No as it was only 455 428 so that's not quite half a million' 'No, because it is closer to 450 000' 'No because it is 460 000' 'No, because it is about 50 000 below' 'No, because it is just over 450 000' 'No, because the number is below 500 000 so it isn't half a million' 'No, because half a million is 500 000 but the number is 455 428' 'No because it would be in the 500 000 so he is wrong because 455 428 is less than half a million' Do not accept e.g. 'Yes, because 455 428 is about half a million' – this is the statement given 'No, because it's only 455 428' 'No because 455 428 isn't close to half a million as it is in the 4s' 'No, because they got 455 428'
2(f) Evidence of counting squares **inside** shape Answer in range 14 to 20 Correct evaluation of 'their area' × 4 and manager correct Or 48 ÷ 4 = 12 and manager correct	M1 A1 E1	 FT if M1 awarded for a correct evaluation of 'their area' × 4 and conclusion made consistent with their answer OR 'their area' is in the range 13 to 22 with 'their area' × 4 correct and manager correct
Alternative method *Evidence of splitting each square into 4* *Answer in range 56 to 80* *Correct evaluation (conclusion) of the area with manager correct*	*M1* *A1* *E1*	*Or for counting up in 4s up to at least 20* *Must not come from incorrect work* *FT if M1 awarded with conclusion made consistent for 'their area'* *OR* *'their area' is in the range 52 to 88 with correct conclusion*

2(a) (Gas usage 21640 – 21345 =) 295 (kWh) (Cost of gas excluding VAT) 295 × 7.2 or 295 × 0.072 2124(p) or (£)21.24 (Cost of gas including VAT) 2230(.2p) or (£)22.30(2)	 B1 M1 A1 B2	<u>Incorrect unit of money is penalised – 1 once only on the first occurrence, by withholding an A or B mark</u> FT 'their 21640 – 21345' for M1 and possible A1 FT 'their number of units' including use of 21640 or 21345 or 21640 + 21345 for M1 but A0 Treat '× 0.72' as incorrect units, allow M1 but A0 FT 'their cost of gas excluding VAT', accepting rounding or truncation to a penny B1 for one of the following: • (Cost of gas including VAT) 21(.)24 × 1.05 • (VAT) 106(.2p) or (£)1.06(2)
Organisation and communication 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 explanations 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.
2(b) 13.2 × 7 + 12.2 + 12.4 (= 117) ÷ 9 13 (°C)	M2 m1 A1	M1 for sight of one of the following: • 13.2 × 7 or equivalent • 92.4 • a sum shown with a given total of 92 to 93 inclusive for 7 possible temperatures FT from M2 or from 12.2 + 12.4 + 'their sum with a total of 92 to 93 inclusive for 7 possible temperatures CAO from 117 ÷ 9 Answer space takes precedence
2(c) a = 98(°) b = 63(°) c = 117(°)	 B1 B1 B1	Answer space takes precedence FT 180 – 'their b' provided 'their b' ≠ 90° or ≠ 180°

5(a) (Gas usage 21640 – 21345 =) 295 (kWh) (Cost of gas excluding VAT) 295 × 7.2 or 295 × 0.072 2124(p) or (£)21.24 (Cost of gas including VAT) 2230(.2p) or (£)22.30(2)	 B1 M1 A1 B2	<u>Incorrect unit of money is penalised – 1 once only on the first occurrence, by withholding an A or B mark</u> FT 'their 21640 – 21345' for M1 and possible A1 FT 'their number of units' including use of 21640 or 21345 or 21640 + 21345 for M1 but A0 Treat '× 0.72' as incorrect units, allow M1 but A0 FT 'their cost of gas excluding VAT', accepting rounding or truncation to a penny B1 for one of the following: • (Cost of gas including VAT) 21(.)24 × 1.05 • (VAT) 106(.2p) or (£)1.06(2)
5(b) 13.2 × 7 + 12.2 + 12.4 (= 117) ÷ 9 13 (°C)	M2 m1 A1	M1 for sight of one of the following: • 13.2 × 7 or equivalent • 92.4 • a sum shown with a given total of 92 to 93 inclusive for 7 possible temperatures FT from M2 or from 12.2 + 12.4 + 'their sum with a total of 92 to 93 inclusive for 7 possible temperatures CAO from 117 ÷ 9 Answer space takes precedence
5(c) a = 98(°) b = 63(°) c = 117(°)	 B1 B1 B1	Answer space takes precedence FT 180 – 'their b' provided 'their b' ≠ 90° or ≠ 180°

<table>
<tr>
<td>7. (Time difference) 5 hours
17:40 + 9 hours 15 minutes + 5 hours

Tuesday 07(:)55 or Tuesday (0)7(:)55 a.m.</td>
<td>B1
M1

A2</td>
<td>Seen or implied
FT adding ‘their 5 hours’, provided ‘their 5 hours’ ≠ 0 or negative
May be seen in stages

Answer space takes precedence unless unambiguously time in the morning from working
A1 for the correct time, 07(:)55 or (0)7(:)55 a.m. or ‘Tuesday 7(:)55’ or ‘Tuesday (0)7(:)55 p.m.’

<u>Special cases and/or implied 5 hours:</u> provided not from incorrect working

<table>
<tr><td>Monday 21:55 (p.m.)</td><td>B1 SC1</td></tr>
<tr><td>Monday (0)9(:)55 p.m.</td><td>B1 SC1</td></tr>
<tr><td>Monday (0)9(:)55</td><td>B1</td></tr>
<tr><td colspan="2"><u>If no marks:</u></td></tr>
<tr><td>Tuesday (0)2(:)55</td><td>SC1</td></tr>
<tr><td>Tuesday (0)2(:)55 a.m.</td><td>SC1</td></tr>
</table>

No marks for Monday (0)9(:)55 a.m. or Tuesday 2(:)55 p.m.</td>
</tr>
</table>

8(a) $\sqrt{\frac{25}{\pi}}$ or $\frac{5}{\sqrt{\pi}}$ or $\frac{\sqrt{25}}{\sqrt{\pi}}$ or equivalent	B2	ISW Accept $\sqrt{(25 \div \pi)}$ or $5 \div \sqrt{\pi}$ or $\sqrt{25} \div \sqrt{\pi}$ For B1 accept π given as 3.1(4...) B1 for sight of any of the following: • $\pi \times \text{radius}^2 = 25$ • $r^2 = 25 / \pi$ • $\pi r^2 = 25$ • $\sqrt{25} / \pi$ • $\sqrt{25} \div \pi$ • $5/\pi$
8(b)(i) $500 \times 60 \div 4$ or equivalent 7500 (cm^3 per minute)	M1 A1	May be seen in stages Answer given within the statement takes precedence
8(b)(ii) $500 \div (2 \times 25)$ or equivalent 10 (cm)	M1 A1	May be seen in stages

8(a) (Population in 1964) $\frac{100 + 682}{100} \times 30000$ or 7.82×30000 or $30000 + 30000 \times \frac{682}{100}$ or equivalent (Population in 2014) $\frac{100 + 20}{100} \times 234600$ or 1.2×234600 281520 (people)	M1 M1 A1	(= 234600 people) *M0 for* *6.82×30000 (= 204600) or* *1.682×30000 (= 50460)* FT 'their derived 234600' including 1.2×204600 (= 245520) 1.2×50460 (= 60552) CAO
8(b) $287\,106 \div 432$ 660 (people per km^2)	M1 A2	A1 for sight of 664.597…. rounded or truncated
8(c) $1442 \times 1000 \div 1\,000\,000$ 1.4(42 g/cm^3)	M1 A1	Mark final answer Allow M1 A1 for $1442 \div 1000 = 1.4(42)$ Do not accept from incorrect working, e.g. M0 A0 if 1.442 seen with an incorrect statement, e.g. • "1 g = 1000 kg" • "g to kg is ÷ 1000"

9(a)(i) (175 – 55) ÷ 8 or 120 ÷ 8 (£) 15	M1 A1	May be seen in stages CAO. Allow an embedded answer of 15, e.g. 8 × 15 = 120
9(a)(ii) (Total including VAT is) 175 + 175 × 0.2(0) or 175 × 1.2(0) or equivalent (£) 210	M2 A1	May be seen in stages M1 for (VAT) 175 × 0.2(0) or 17.5 + 17.5 (= 35) or equivalent If no marks, award • either SC2 for total including VAT correctly evaluated starting with charge 55, 15 or 'their 15' from (b)(i), i.e. 66, 18 or correctly evaluated 'their 15' × 1.20 • or SC1 for a calculation for total including VAT starting with charge 55, 15 or 'their 15' from (b)(i), i.e. 55 × 1.20, 15 × 1.20 or 'their 15' × 1.20 or equivalents
9(b)(i) 'No' selected or unambiguous implied with reason, e.g. 'no correlation' 'no pattern' '(points are) random' 'no trend' 'number of leaves is not affected by height'	E1	Allow, e.g. 'No' with 'different flowers have different (numbers of) leaves' 'scattered' ' the data (or answers) are not consistent' Do not accept, e.g. 'No' with 'there isn't a leaf with height 6cm' 'it does not show on the graph' 'there is no data for 6' 'it doesn't say how many there are' 'not enough research' 'sample too small' 'some points close together' 'data is not reliable'
9(b)(ii) 7.5 cm	B1	
9(b)(iii) 17.5 – 13 or 9 × 0.5 4.5 (cm)	M1 A1	Allow 13 – 17.5 Answer space takes precedence Allow FT -4.5 (cm) from 13 – 17.5 If no marks, award SC1 for the difference correctly evaluated provided either 17.5 or 13 is correct
9(b)(iv) 80(%)	B2	Answer space takes precedence B1 for sight of any of the following: • 8/10 • 8 ÷ 10 • (Including 23, 100 × 9 ÷ 10 =) 90 (%) B0 for '8 out of 10'

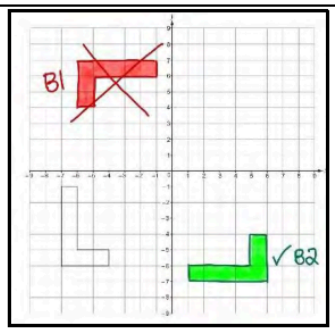
18.(a)	$\frac{21{\cdot}76}{32}$ (× 100%) or equivalent = 68 (%)	M1 A1	Allow 0·68 to imply M1.
18.(b)	$5t - 3t = 14 - 3$ OR $3 - 14 = 3t - 5t$ $2t = 11$ OR $-11 = -2t$ $t = \frac{11}{2}$ or equivalent	B1 B1 B1	FT until 2nd error. Mark final answer. Correct answer implies B1B1B1. Do not allow $-t = -11/2$ or $t = -11/-2$. A final answer of '11 ÷ 2' is B1B1B0. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise, accept a fraction. Allow B1B1B1 for a correct embedded answer BUT only B1B1B0 if contradicted by $t \neq 11/2$ or equivalent.

19. Method to eliminate one variable e.g. equal coefficients **AND** <u>appropriate intention to</u> add or subtract or use a method of substitution. First variable found $x = -4$ or $y = 2$ Substitute to find the 2nd variable. Second variable found.	 M1 A1 m1 A1	 Allow one error in one term (not the term with equal coefficients). CAO. Answer must be whole number (e.g. not $x = -12/3$) FT substitution of their '1st variable' if M1 gained. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise, accept a fraction. No marks for 'trial and improvement'. No marks for an unsupported answer.

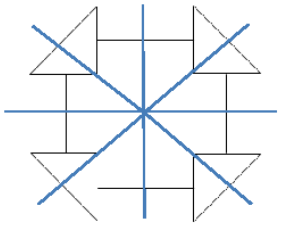
20.(a) $5(\cdot 0) \times 10^6$	B2	Mark final answer. Award B1 for one of the following: • sight of $0 \cdot 5 \times 10^7$ • sight of 5 000 000 • equivalent correct value but not in standard form • sight of 30 000 AND 0·006 • 5×10^n ($n \geq 3$, but not 6), following one place value error in one of the given numbers.
20.(b) $4 \cdot 795(0) \times 10^4$	B2	Mark final answer. B1 for one of the following: • sight of $479 \cdot 5(0) \times 10^2$ • $4 \cdot 8(0) \times 10^4$ • sight of 47 950 • equivalent correct value but not in standard form • sight of 47800 AND 150 • 'their 47 950' is written correctly in standard form, following one place value error in one of the given numbers or in the addition of 47800 AND 150.
21.(a) $x = \sqrt{25^2 - 10^2}$	B1	
21. (b) $\sin 40^\circ = \frac{y}{25}$	B1	

19.(b)	Use of $\frac{45}{9}$ or equivalent	M1	Sight of an appropriate 5 (or 40) implies M1.
	(£)40 AND (£)5	A1	Accept in either order.

19.(a)	$7{\cdot}6 \times 10^{-3}$	B1	
19.(b)	6×10^{5}	B1	
19.(c)	$2{\cdot}8 \times 10^{4}$	B2	Mark final answer. Award B1 for one of the following: • sight of 28×10^{3} • sight of 28 000 • equivalent correct value but not in standard form • sight of 23 000 AND 5000 • 'their 28000' is written correctly in standard form, following one place value error in one of the numbers from work seen.

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).

2.(a) 106000	B2	B1 for one of the following: • sight of 53000 • one hundred and six thousand • correctly doubling 'their 53 000' if it is first written in figures, provided 'their 53 000' is at least four figures and starts with the digits 5 and 3 (i.e. a place value error). • 106 followed by a minimum of two zeros
2.(b) 3600	B1	
2.(c) 42	B1	
2.(d) 1000 OR 980 OR 1030	B2	B1 for 100 × 10 OR 100 × 9·8 OR 103 × 10
2.(e) No, with appropriate working e.g. • (626 ÷ 3 =) 208 r.2 • (626 ÷ 3 =) 208·6(6…) • 6 + 2 + 6 = 14 AND 14 is not a multiple of 3 • 3 × 208 = 624 AND 3 × 209 = 627	B1	Allow No with 208·2 Arithmetic seen must be correct and show a remainder of 2 or first decimal place.

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	

7(a) 8 × 1172 ÷ 5 or 1172 × 1.6	M1	Do not allow 1172 × 1.5
1875.2 (km)	A1	Accept 1875 (km) from correct working Answer space takes precedence
7(b) 0.366 × 1000 ÷ 60	M1	
6.1 (m/s)	A1	Accept 6 (m/s) from correct working Answer space takes precedence

7(c) (Difference 60 million – 41 000 000 =) 19 000 000 or 19 million	B1	May be implied in further working Allow 19 m(il)
(Underspend) $\frac{19\,000\,000}{60\,000\,000}$ (× 100) or equivalent	M1	FT 'their 60 million – 41 000 000' including if a place value error made
31.67(%)	A1	CAO (must be 2 d.p.) Answer space takes precedence
7(c) Alternative method *(Underspend)* *(100 –)* $\frac{41\,000\,000}{60\,000\,000}$ *(× 100) or equivalent*	*M1*	*Allow place value error*
31.67(%)	*A2*	*CAO (must be 2 d.p.)* *Answer space takes precedence* *A1 for 31.6(6…%), 31.7(%), 32(%) or 68.33(%)*
7(d) 4×10^6	B1	
7(e) (Change to \$) 350 × 1.25	M1	*Do not penalise slips in giving incorrect use of £ for \$*
(\$)437.5(0)	A1	
(Only \$10 and \$50 notes available so he can buy) (\$)430	A1	FT 'their (\$)437.5(0)' (provided not a multiple of 10) rounded down to nearest multiple of 10 Accept stated or implied as (\$)7.50 can't be converted (\$)430 implies previous M1 A1, provided not from incorrect working
(Fewest number of notes making up \$430) **8** \$50 (notes) and **3** \$10 (notes)	A1	FT 'their \$430' provided it is a multiple of 10 (and provided M1 previously awarded) Must be fewest number of notes, that may be listed Sight of correct number of notes with no incorrect working implies previous A1, unless contradicted
(Cost in £ to buy \$430 is) 430 ÷ 1.25 or 350 – 7.5(0) ÷ 1.25 (= 350 – 6)	M1	FT 'their whole number multiple of \$10' ÷ 1.25 Ignore attempt at any further calculation if 430 ÷ 1.25 seen
(£)344	A1	Must be <(£)350 **and** depends on M1 M1 previously awarded Mark final answer If final M0 A0, then award SC1 for (£) 6 (left) or similar on FT, provided not from incorrect or inappropriate working
7(e) Alternative method *£40 = \$50 and £8 = \$10* *8 \$50 notes, 3 \$10 notes*	*M1* *A3*	*A2 for 8 \$50 notes* ***and** sight of 350 – 8 × 40 or equivalent* *OR* *A1 for 8 \$50 notes*
(Cost to buy £350 is) 8 × 40 + 3 × 8 *(£)344*	*M1* *A1*	

8(a)(i) 440 × 48 ÷ 2.2 9600 (kg)	M1 A1	May be seen in stages Mark final answer Allow answers in the inclusive range 9588 to 9601 from premature approximation Answer space takes precedence
8(a)(ii) 230 000 000 000	B1	
8(b) (Area) 2.47 × 40000 ÷ 10000 or equivalent 9.88 (acres) (Density of trees) 615 ÷ 9.88 62(.2...trees per acre) (>60)	 M1 A1 m1 A1	**Throughout, if 4 marks are awarded, penalise -1 if conclusion 'Yes' is not indicated** **On FT the conclusion may be different to 'Yes'** May be implied in further working Allow 9.8 (acres), 9.9 (acres) or 10 (acres) Depends on M1 m1 previously awarded
8(b) Alternative method 1 *(Area) 2.47 × 40 000 ÷ 10 000 or equivalent* *9.88 (acres)* *(Maximum number of trees) 9.88 × 60* *592(.8) (trees) or 593 (trees) (< 615)*	*M1* *A1* *m1* *A1*	*May be implied in further working* *Allow 9.8 (acres), 9.9 (acres) or 10 (acres)* *Depends on M1 m1 previously awarded* *Allow suitable rounding, e.g. 590 or 600*
8(b) Alternative method 2 *(Area) 2.47 × 40 000 ÷ 10 000 or equivalent* *9.88 (acres)* *(Minimum area) 615 ÷ 60* *10.25 (acres) (> 9.88)*	*M1* *A1* *M1* *A1*	*May be implied in further working* *Allow 9.8 (acres), 9.9 (acres) or 10 (acres)* *Do not allow embedded in further working* *Allow rounded to 10 (acres) provided 'their area' ($9.88m^2$) has not been rounded to 10*
8(b) Alternative method 3 *(Minimum area) 615 ÷ 60* *10.25 (acres)* *(Convert to m^2) 10000 × 10.25 ÷ 2.47* *41 497(.97 m^2) or 41 498(m^2) (>40 000)*	*M1* *A1* *m1* *A1*	*May be implied in further working* *Allow 10 (acres)* *Depends on M1 m1 previously awarded* *Accept suitable rounding, e.g. 41 000 or 41 500*
8(b) Alternative method 4 *(Trees in 2.47 acres) 615 ÷ (40 000 ÷ 10 000) or equivalent* *153.75 (trees)* *(Density of trees) 153.75 ÷ 2.47* *62(.2...trees per acre) (> 60)*	*M1* *A1* *m1* *A1*	 *May be implied in further working* *Allow 153, 153.8 or 154 (trees)* *Depends on M1 m1 previously awarded*
8(b) Alternative method 5 *(Forest area per tree) 40 000 ÷ 615* *65(.0406.. m^2)* *(Fire risk, area per tree) 10 000 ÷ (60 × 2.47)* *67(.476...m^2) (> 65)*	*M1* *A1* *M1* *A1*	*Do not allow embedded in further working*

8(c)(i) (Height of the tree =) $21 \times \tan 39$ 17.(…. m)	M2 A1	*OR alternative full method* M1 for $\tan 39 = \frac{\text{height of tree}}{21}$ CAO
8(c)(i) Alternative method 1 *Hypotenuse = 21/cos39* *(= 27.02…)* ***AND** Height* = $\sqrt{(27(.02)^2 - 21^2)}$ 16.9(7…m) to 17.(0..m)	*M2* *A1*	*M1 for Hypotenuse = 21/cos39* *(= 27.02…)* ***AND** Height*$^2 = 27(.02)^2 - 21^2$ *CAO*
8(c)(i) Alternative method 2 *(Angle of elevation)* $\tan^{-1}\frac{17}{21}$ *38.9(9…°) or 39(°)*	*M2* *A1*	*M1 tan (elevation)* $= \frac{17}{21}$ *CAO*
8(c)(i) Alternative method 3 *(Horizontal distance)* $\frac{17}{\tan 39}$ *20.9(98…m) or 21m*	*M2* *A1*	*M1 for* $\tan 39 = \frac{17}{\text{distance}}$ *CAO*
8(c)(ii) diameter $= \frac{1.75}{\pi}$ or (radius =) $\frac{1.75}{2 \times \pi}$ (Area of cross section =) $\pi \times (1.75 \div 2\pi)^2$ $\times 17 \div 2$ (Volume) answer in the range 2.07 (m^3) to 2.15 (m^3)	M2 M1 m1 A1	M1 for any one of the following: • $1.75 = \pi \times$ diameter • $1.75 = 2 \times \pi \times$ radius (Note: radius = $\frac{7}{8\pi}$ m, radius ≈ 0.28m) FT for 'their derived radius' provided it is from a calculation involving the use of π (Note: area of cross section = $\frac{49}{64\pi}$ m^2 area of cross section ≈ 0.24 m^2) FT provided previous M1awarded CAO, accept an answer of 2 (m^3) from correct working without sight of premature approximation leading to an answer outside the range

9. (Amount of tea in full cup =) (44 ÷ 2) × 7 or equivalent = 154 (ml)	M1 A1	M1 for full complete method. May be seen in stages. If M0 awarded, award SC1 for one of the following: • appropriate sight of 22 • final answer of 61·6(ml) (from (44 ÷ 5) × 7).
9. Alternative method *(Amount of tea in full cup =)* *(44 ÷ 2) × 5 + 44* *= 154 (ml)*	*M1* *A1*	*M1 for full complete method.* *May be seen in stages.* *If M0 awarded, award SC1 for appropriate sight of 22.*

9(a)(i) Entries 146 and 160 in the table and the cumulative frequency diagram completed correctly (correct plots (11, 146) and (13, 160) and all plots joined)	B2	B1 for any one of the following: • 146 and 160 in the table, correct plots but **not** joined • 146 and 160 in the table, with one correct plot and one incorrect plot in completing the **cumulative** frequency diagram with plots joined • one error in the table, including FT 'their 146' + 14 and these **cumulative** entries used correctly to complete the **cumulative** frequency diagram with plots joined • correct cumulative frequency diagram with plots joined, with incorrect, incomplete or not attempted entries in the table
9(a)(ii) 8.2 to 8.4 (minutes)	B1	Answer space takes precedence Allow 8 minutes 12 seconds to 8 minutes 24 seconds FT reading from the graph for 'their median', from ½ × 'their 160', provided 'their 160' ≥ 110, with a tolerance of ½ small square from 'their **cumulative** frequency graph', provided it is possible to read 'their median' from the vertical axis on the graph paper provided
9(a)(iii) 7.2 minutes	B1	Answer space in the statement takes precedence, if blank award for indication of '7.2' (circled) in the list Allow '7' in the answer space provided 7.2 indicated in the list Do not accept '8' in the answer space if 7.2 indicated in the list
9(a)(iv) $\frac{20}{160}$ (× 100) or $\frac{1}{2}$ × 25 (%) or equivalent 12.5 (%) or 12½ (%)	M1 A1	FT for (100 ×) 20/'their 160', provided 'their 160'> 106 On FT allow rounding or truncation to 1 decimal place
9(b) (Costs are 180 + 220) (£) 400 **AND** (Profit is 700 – 180 – 220) (£) 300 **OR** (Receipts / Costs =) $\frac{700}{400}$ (× 100) (Percentage profit is) $\frac{300}{400}$ (× 100) or $\frac{700}{400}$ (× 100) – 1 (× 100) 75 (%)	B1 M1 A1	May be embedded, e.g. 700 – 400 = 300 (= 1.75 or 175%) FT 'their 400' and 700 – 'their 400' provided their costs or profit are ≠ 180, ≠ 220 and ≠ 700 CAO Allow if all costs and the total are consistently multiplied by 3.
9(c) 8(.)40 ÷ 1(.)20 or 8(.)40 – 8(.)40 ÷ 6 or equivalent (£) 7 or 700 (p)	M1 A1	Accept a **complete** and **convincing** method of trial and improvement If units are given they must be correct Sight of 7 + 1.40 = 8.40 is awarded M1 A0 unless (£)7 is selected

11(a) 8 × 1172 ÷ 5 or 1172 × 1.6	M1	Do not allow 1172 × 1.5
1875.2 (km)	A1	Accept 1875 (km) from correct working Answer space takes precedence
11(b) 0.366 × 1000 ÷ 60	M1	
6.1 (m/s)	A1	Accept 6 (m/s) from correct working Answer space takes precedence

18. $7y-2=4y+1+9$ or $7y-2=4y+10$ $7y-4y=10+2$ $3y=12$ $y=4$	B1 B1 B1 B1	FT until 2nd error. Allow $7y-2-9=4y+1$ or $7y-11=4y+1$ Allow $7y-4y=1+11$. Mark final answer. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. An embedded, unsupported answer or an answer following trial and improvement of 4 without showing $7y-2=4y+1+9$ or equivalent gains B1 only. Note: $7y-2+9=4y+1$ B0 $7y-4y=1-7$ B1 $3y=-6$ B1 $y=-2$ B1 $7y-2=4y+1-9$ B0 $7y-4y=-8+2$ B1 $3y=-6$ B1 $y=-2$ B1 $7y-2=4y+1$ B0 $7y-4y=1+2$ B1 $3y=3$ B1 $y=1$ B1 If $3y=-6$ or $3y=3$ seen with no previous workings, award B0 B1 B1 with a possible final B1 if correct answer seen. **If no marks awarded**, award SC1 for sight of the following: • $7y+7=4y+1$ (adding 9 on the wrong side) • $4y+10$ • $7y-11$ (from correct working).

20. (Radius of smaller circle =) 4 (cm) **AND** (Radius of larger circle = 4 + 2 =) 6 (cm)		Check diagram for answers. B1 May be seen or implied in later working.
(Width of rectangle = 8 + 2 + 2 or 6 + 6 =) 12 (cm) **AND** (Length of rectangle = 8 + 2 + 2 + 8 or 6 + 6 + 8 =) 20 (cm)	B1	May be seen or implied in later working. Implies previous B1. FT 2 × 'their 6'. FT 8 + 2 × 'their 6'.
(Shaded area =) $20 \times 12 - \pi \times 4^2 - \pi \times 6^2$ or $(12 \times 12) - \pi \times 6^2 + (12 \times 8) - \pi \times 4^2$	M2	FT 'their 12(cm)' and 'their 20(cm)' for a possible M2 and possible A1. FT 'their 4(cm)' and 'their 6(cm)' for a possible M2 A0. If a 12 × 12 square and 12 × 8 rectangle used, the previous B1 is implied. Award M1A0 for sight of any of the following (FT 'their 12(cm)', 'their 20(cm)', 'their 4(cm)' and 'their 6(cm)'): • (Area of the smaller circle =) $\pi \times 4^2$ (= 50·265...cm^2) • (Area of the larger circle =) $\pi \times 6^2$ (= 113·097.. cm^2) • (Shaded area =) $20 \times 12 - \pi \times x^2 - \pi \times y^2$
Accept answers in the range 76·6 to 76·72 (cm^2) or $240 - 52\pi$ (cm^2)	A1	Allow 77 (cm^2) from correct working.

121	B1	
2.(a) 196	B1	Allow 14^2.
2.(b) 13	B1	
2.(c) $\frac{280 + 410}{2}$ $(= \frac{690}{2})$ OR $280 + \frac{410 - 280}{2}$ $(= 280 + \frac{130}{2})$ OR $410 - \frac{410 - 280}{2}$ $(= 410 - \frac{130}{2})$ OR writing numbers between 280 and 410 AND attempting to identify the middle number.	M1	May be seen in stages. Numbers could be multiples of 5 or 10. Do not accept multiples of 20.
345 (m)	A1	If no marks, award SC1 for: • an answer of 485 or 550 • sight of 345 but not as a final answer.
2.(c) W 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.

3.(c)(ii)	0	B1	
4.(a)	$\frac{55}{66}$ $\frac{35}{42}$	B2	B1 for either: • two correct answers circled, with one incorrect answer. • one correct answer circled, with up to one incorrect answer.
4.(b)	0·05	B1	Accept $\frac{1}{20}$. B0 for 1 ÷ 20.
4.(c)	3 6 AND 5 7 OR 5 7 AND 3 6	B2	B1 for an answer of either: • 3 7 AND 5 6

Unit 1: Intermediate Tier	Mark	Comments
5(a) 50 × 3 × 1.8(0) or 50 × 3 × 180	M2	M1 for any of the following: • 50 × 3 • 50 × 1.8(0) • 50 × 180 • 3 × 1.8(0) • 3 × 180
(£) 270 or 27000(p)	A2	For A2, if units are given, they must be correct, otherwise A1 for 270p or £27000 Ignoring units, A1 for any of the following: • (50 × 3 =) 150 • (50 × 1.8(0) =) 90 • (50 × 180 =) 9000 • (3 × 1.8(0) =) 5.4(0) • (3 × 180 =) 540
5(b)(i) (Mean of 8 temperatures is -56 ÷ 8 =) -7 (°C)	B3	Must not be from incorrect working, other than allowing from 56 ÷ 8 B2 for any one of the following: • -56 ÷ 8 • 56 ÷ 8 = 7 B1 for any one of the following: • (sum of temperatures) -56 • (sum of temperatures) 56 • sight of 'their sum of temperatures' ÷ 8, provided the summation is not from a sum involving all positive integers or all negative integers, with or without a negative sign inserted. If '÷ 8' is not seen, it may be implied from 'their sum' and 'their mean' (rounded or truncated)
5(b)(ii) (-56 + -16) ÷ 9 or -72 ÷ 9	M1	FT 'their -56' from (b)(i)
-8 (°C)	A1	On FT allow a rounded or truncated answer Allow a correctly rounded or truncated answer, to 1d.p. for '('their -56' + -16) ÷ 9' to imply M1 A1
5(c)(i) 20 × (8.6 (± 0.2))	M1	
172 (± 4 m)	A1	Do not award from sight of an incorrect evaluation of 'their 8.6' × 20
5(c)(ii) 232° ± 2°	B1	

Unit 1: Intermediate Tier	Mark	Comments
8(a)(i) 200 – 80 or 90 + 30 120 (customers)	M1 A1	
8(a)(ii) 32 seconds	B1	
8(a)(iii) $\frac{200-170}{200}$ or $\frac{30}{200}$ or $\frac{15}{100}$ $\frac{3}{20}$	M1 A1	Award M1 for 0.15 or 15% Only ignore further working if written as 0.15 or 15% If no marks, award SC1 for an answer of $\frac{17}{20}$ (from 40 seconds or less)
8(b)(i) 36	B1	
8(b)(ii) 46 – 20 26	M1 A1	Allow 20 – 46
8(c) 'No' unambiguously stated or implied AND a reason, e.g. 'upper quartile is higher this year' '75% reading higher this year' 'interval was 37 (or 38) to 50 seconds last year, this year it is 46 to 50 seconds'	E1	Do not ignore incorrect values for the upper quartiles given, E0 if 'upper quartile' or '75%' stated with incorrect upper quartile readings Allow 'No' with a reason, e.g. '(last year) 38, (this year) 46' '(last year) 37.(…), (this year) 46' Do not accept, e.g. 'range greater this year' 'lower quartile is lower this year' 'median higher this year' 'customers still waiting at 50 seconds'

Unit 1: Foundation Tier	Mark	Comments
9(a) 50 × 3 × 1.8(0) or 50 × 3 × 180	M2	M1 for any of the following: • 50 × 3 • 50 × 1.8(0) • 50 × 180 • 3 × 1.8(0) • 3 × 180
(£) 270 or 27000(p)	A2	For A2, if units are given, they must be correct, otherwise A1 for 270p or £27000 Ignoring units, A1 for any of the following: • (50 × 3 =) 150 • (50 × 1.8(0) =) 90 • (50 × 180 =) 9000 • (3 × 1.8(0) =) 5.4(0) • (3 × 180 =) 540
9(b)(i) (Mean of 8 temperatures is -56 ÷ 8 =) -7 (°C)	B3	Must not be from incorrect working, other than allowing from 56 ÷ 8 B2 for any one of the following: • -56 ÷ 8 • 56 ÷ 8 = 7 B1 for any one of the following: • (sum of temperatures) -56 • (sum of temperatures) 56 • sight of 'their sum of temperatures' ÷ 8, provided the summation is not from a sum involving all positive integers or all negative integers, with or without a negative sign inserted. If '÷ 8' is not seen, it may be implied from 'their sum' and 'their mean' (rounded or truncated)
9(b)(ii) (-56 + -16) ÷ 9 or -72 ÷ 9	M1	FT 'their -56' from (b)(i)
-8 (°C)	A1	On FT allow a rounded or truncated answer Allow a correctly rounded or truncated answer, to 1d.p. for '('their -56' + -16) ÷ 9' to imply M1 A1
9(c)(i) 20 × (8.6 (± 0.2))	M1	
172 (± 4 m)	A1	Do not award from sight of an incorrect evaluation of 'their 8.6' × 20
9(c)(ii) 232° ± 2°	B1	

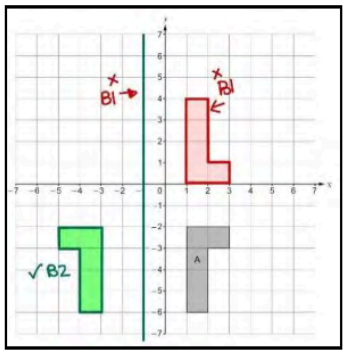
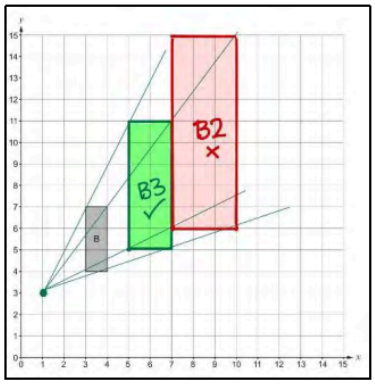
Unit 2: Foundation Tier	Mark	Comments
9.		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6 (Cost of gas = Number of kWh) × 0(.)12	M1 m1	(= 1548.4474 kWh)
(£)185.76 to (£)185.82 or 18576(p) to 18582(p)	A1	(1548.4474 × 0.12 = £185.813688)
(Standing charge 30 × (0.)32 =) (£)9.6(0) or 960(p)	B1	CAO
(Total of gas and standing charge) *(£)195.36 to (£)195.42 or 19536(p) to 19542(p)	B1	FT 'their derived cost of gas' + 'their 30 × (0.)32' correctly evaluated, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh May be implied in later working
(Total including VAT =) 1.05 × 195(.)36 to 1.05 × 195(.)42	M1	FT 'their derived total cost of gas **+** 'their standing charge'
*(£)205.12 to (£)205.19(1) or 20512(p) to 20519(.1p)	A1	ISW further rounding, e.g. (£)205, (£)205.20 If final B0 B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas' having omitted the standing charge, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh *Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*
9. Alternative method: Gas per day		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6 *(Number of kWh per day) ÷ 30* *(Cost of gas per day) × 0(.)12*	*M1* *m1* *m1*	*(= 1548.4474 kWh)* *(= 51.6149133…kWh)*
(Cost of gas per day =) (£)6.19(…) or 619(...p)	*A1*	*CAO*
(Total of gas and standing charge) *6.51(…) or 651.(…p)*	*B1*	*FT 'their derived cost of gas per day' + (0.)32 correctly evaluated* *May be implied in later working*
(Total including VAT =) *1.05 × 6.51(…) × 30*	*M1*	*(= 6.83(94…) × 30 or 6.84 × 30)* *FT 'their derived cost of gas per day **+** (0.)32, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh*
**(£)205.12 to (£)205.19(1)* *or 20512(p) to 20519(.1p)*	*A1*	*ISW further rounding, e.g. (£)205, (£)205.20* *If final B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas per day' × 30 having omitted the standing charge,* provided 'their cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh **Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*

Unit 2: Intermediate Tier	Mark	Comments
9(a)(i) 5×10^8 or 5.0×10^8	B1	
9(a)(ii) **140** $\times 10^9$ $\div 300$ $\div 24$ 19 400 000 (kg per hour)	 M1 M1 M1 A2	Method marks can be awarded in any order but the operation must be unique (not contradicted or repeated in the working) '÷ 7200' implies final M1 M1 Award M3 for sight of $\frac{140 \times 10^9}{300 \times 24}$ or $\frac{1.4 \times 10^{11}}{7.2 \times 10^3}$ or equivalent ISW, accept 19.4 million or 1.94×10^7 or equivalent A1 for sight of 19 444 444(.44…) or for incorrect rounding or truncation of this answer FT, for A1, from M1 M0 M1 or M1 M1 M0, including if an incorrect 3rd term is included, for correct evaluation of 'their calculation' **and** expressing 'their final answer' correct to 3 significant figures provided rounding is required, e.g. • $140 \times 10^9 \div 300$ leading to 467 000 000 • $140 \times 10^9 \div 24$ leading to 5 830 000 000 • $140 \times 10^9 \div 300 \div$ *12* leading to *38 900 000* ($140 \times 10^9 \div 300 \times$ *24* = *11 200 000 000*, $140 \times 10^9 \div 24 \times$ *300* = *1 750 000 000 000*, *no rounding required, hence A0)* FT, for A1, from M0 M1 M1 for an answer of 194 000, 1 940 000, 194 000 000, or 1 940 000 000, provided it is from a correct evaluation of 'their calculation' If no marks, award SC1 for equivalent operations used without 140, i.e. $\frac{10^9}{300 \times 24}$ or $10^9 \div 300 \div 24$ or equivalent
9(b)(i) (Venus orbit) $2 \times \pi \times 1.08 \times 10^8$ or 678 000 000 to 680 000 000 or 6.78×10^8 to 6.8×10^8 (To find distance travelled in one day) $\div 224.7$ (Distance in one day) $3.(0....) \times 10^6$	M1 M1 A2	 FT 'their derived orbit' provided π is involved in 'their calculation of Venus orbit' CAO A1 for any one of the following answers: • (not in standard form) 3 000 000 (km) • (incorrect standard form) e.g. 30×10^5 • (in the range) 3 017 000 (km) to 3 026 300 (km) • (in terms of π) e.g. 961 281.7089π (km) • ($\pi \times 1.08 \times 10^8 \div 224.7 =$) $1.5(\ldots) \times 10^6$ If no marks, award SC1 for an answer of $4.8(0\ldots) \times 10^5$ (from $1.08 \times 10^8 \div 224.7$) or $9.6(1\ldots) \times 10^5$ (from $2 \times 1.08 \times 10^8 \div 224.7$)

Unit 2: Intermediate Tier	Mark	Comments
9(b)(ii) 368 187 456 (km^2)	B3	ISW Allow appropriate rounding from correct working, such as 368 187 500 or 368 000 000 or 370 000 000 B2 for any one of the following: • 8 × 460 234 320 ÷ 10 • 7 × 460 234 320 ÷ 10 + 460 234 320 ÷ 10 • 460 234 320 – 2 × 460 234 320 ÷ 10 • (2 × 460 234 320 ÷ 10 =) 92 046 864 • (7 × 460 234 320 ÷ 10 =) 322 164 024 B1 for any one of the following, including embedded in other working: • 460 234 320 ÷ 10 • (460 234 320 ÷ 10 =) 46 023 432 *If errors in calculating 1 + 7 or 1 + 2 + 7 are seen, then award B2 or B1 as appropriate e.g.* • *1 + 7 = 9, 9 × 460 234 320 ÷ 10* *B2* • *9 × 460 234 320 ÷ 10* *B1 (embedded 460 234 320 ÷ 10)*

15.(a) $\frac{5}{8}$ on 'Bus B' branch.	B1	Numerator and denominator must be integers. Allow any equivalent to $\frac{5}{8}$ e.g. 0·625. Do not allow 0·63.
$\frac{1}{2}$ or $\frac{4}{8}$ or 0·5 on **all** 'seat branches'	B1	Allow any equivalent to $\frac{1}{2}$.
15.(b) $\frac{5}{8} \times \frac{1}{2}$ or equivalent	M1	FT 'their $\frac{5}{8}$' × 'their $\frac{1}{2}$' provided both values < 1.
$= \frac{5}{16}$ or $\frac{20}{64}$ or $\frac{25}{80}$ or equivalent ISW	A1	Do not allow rounded or truncated answers if decimal given. Numerator and denominator must be integers.

18. (Distribution = 360 – 60 – 138 =) 162(°)	B1	May be seen on diagram.
$\frac{162}{360}$ or $\frac{9}{20}$ or equivalent	M1	FT $\frac{\text{'their stated 162'}}{360}$, provided obtuse.
= 0·45	A1	Answer must be given as a decimal. Mark final answer. FT provided 'their fraction' < 1. If 0·45 seen, but then 45% or $\frac{45}{100}$ or equivalent award B1M1A1. Award B1 M1 A0 for 45% or equivalent (not a decimal) if 0·45 not seen. If no marks, award SC1 for the correctly evaluated decimal equivalent of an answer of $\frac{\text{'their stated 162'}}{60 + 138 + \text{'their stated 162'}}$ e.g. $\frac{154}{352}$ = 0·4375 (angle measured in diagram) An unsupported answer of 0·45 is awarded B1M1A1.
18. Alternative method *1 – $\frac{198}{360}$ or 1 – $\frac{11}{20}$ or equivalent*	*M2*	*Award M1 for 1 – $\frac{\text{'their 138 + 60'}}{360}$.*
= 0·45	*A1*	*Answer must be given as a decimal.* *Mark final answer.* *FT provided 1 – 'their fraction < 1'.*

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).

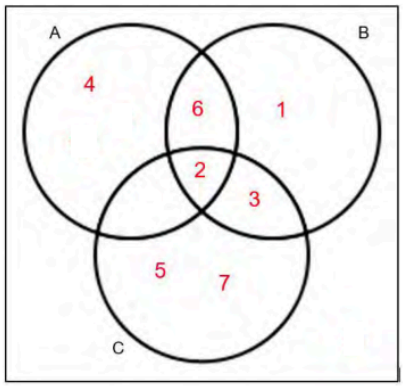
20.(a) (Berwyn = £) $0{\cdot}6x$ or equivalent	B1	CAO. Must be in terms of x e.g. award B0 for (£)0·6.
20.(b) Sight of (Carys = £)$0{\cdot}3x$ AND (Delyth = £)$0{\cdot}7x$ or equivalent	B1	Must be seen and in terms of x e.g. award B0 for (£)0·3 and (£)0·7.
(£)$0{\cdot}3x + $ (£)$0{\cdot}4x$ or equivalent	B1	
(£)$0{\cdot}7x$ or Delyth or equivalent	B1	Final answer of (£)$0{\cdot}7x$ or Delyth must be clearly identified, convincing and from correct working. If no marks awarded or if only the first B1 awarded, then award an additional SC1 for one of the following: • (£)0·3 + (£)0·4 = (£)0·7 (or Delyth) • (£)30 + (£)40 = (£)70 (or Delyth) or equivalent • Carys + Aled = Delyth. Carys + Aled = (£)$0{\cdot}7x$ is awarded full marks provided the first B1 is awarded. If first B1 not awarded, award SC1 for sight of Carys + Aled = (£)$0{\cdot}7x$.

9.(a) − 17 − 6 3 12	B1	This order only
9.(b) − 4·6	B1	
9.(c) − 32	B1	

9(a) (Length of the flagpole below the rod =) $3.8 \times \sin 55°$ or $3.8 \times \cos(90° - 55°)$ or $380 \times \sin 55°$ or $380 \times \cos(90° - 55°)$	M2	Or alternative full method M1 for correct working without isolating 'length' $\sin 55° = \frac{\text{length}}{3.8}$ or $\cos(90° - 55°) = \frac{\text{length}}{3.8}$ or $\sin 55° = \frac{\text{length}}{380}$ or $\cos(90° - 55°) = \frac{\text{length}}{380}$
3.11(2…m) or 311(.2.. cm)	A1	Allow 3.1 (m) or 310 (cm)
(Total length 1.5 + 3.11 =) 4.61 (m) or 461 (cm)	A1	Must be to the nearest cm FT provided at least M1 previously awarded, i.e. for 1.5 + 'their 3(.)11' correctly evaluated, to nearest cm, and 'their 3.11' is to at least 2 decimal places If units are given they must be correct
9(b)(i) $120 \times 64 \div 80$ or 64×1.5 or 120×0.8 or $120 \div 1.25$ or $64 \div \frac{2}{3}$ or equivalent	M1	
96 (cm)	A1	Answer space takes precedence
9(b)(ii) $75 \times 80 \div 120$ or $75 \div 1.5$ or $75 \times \frac{2}{3}$ or $80 \div 1.6$ or 80×0.625 or $64 \times 75 \div 96$ or equivalent	M1	FT from (b)(i) $64 \times 75 \div$ 'their 96' or equivalent
50 (cm)	A1	Answer space takes precedence

15.(a) $3y = 24$ or $y = 24/3$ $y = 8$	B1 B1	FT from $3y = k$. Mark final answer. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction or a decimal rounded or truncated to at least 1 decimal place. Unsupported answer of 8 is awarded B1 B1. Allow an embedded answer but penalise -1 if contradicted by $y \neq 8$.
15.(b) $8p - 3p = -25 - 5$ OR $5 + 25 = 3p - 8p$ $5p = -30$ OR $30 = -5p$ $p = -6$	B1 B1 B1	FT until 2nd error. Mark final answer. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction or a decimal rounded or truncated to at least 1 decimal place. Unsupported answer of –6 is awarded B1 B1 B1. Allow an embedded answer but penalise -1 if contradicted by $p \neq -6$ or equivalent.

17. $(6x =)$ $360 - (42 \times 6)$ $(= 108(°))$ $\div 6$ $(x =)$ $18(°)$	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).
17. 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).*
17. 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).*
18. (Area =) $\frac{(15 + 9)}{2} \times 8$ or equivalent $= 96$ cm^2	M1 A1 U1	May be seen in stages. Award M1 for one of the following: • $\frac{(15 - 9) \times 8}{2} + 8 \times 9$ $(= 24 + 72)$ • $15 \times 8 - \frac{8 \times (15 - 9)}{2}$ $(= 120 - 24)$ Allow M1A1 for correct intent or complete method seen with correct answer .e.g. 15 + 9 × 8 ÷ 2 = 96 Independent of all other marks.

18. 	B4	Ignore numbers crossed out. Numbers repeated in more than one subset, 0 or numbers greater than 7 should not be credited. Allow repeated numbers in the same subset. Award B4 for correct answer only (all 7 numbers in correct position with no other or repeated numbers). Award B3 for one of the following: • 7 numbers in correct position with other numbers • 5 or 6 numbers in the correct position Award B2 for 3 or 4 numbers in correct position. Award B1 for 2 numbers in the correct position.

18. (a) $45x + 23y = 89520$ or $23y + 45x = 89520$	B1	May be seen in part (b) as long as not contradicted by an incorrect equation in part (a). Award B1 if 89 520 or $45x + 23y$ seen in the table in (a), but $45x + 23y = 89520$ seen in (b).
18.(b) Method to eliminate one variable e.g. equal coefficients AND an appropriate intention to subtract or add (whichever is appropriate) or use a method of substitution. First variable found (The number of seated tickets sold, x =) 1560 or (The number of standing tickets sold, y =) 840 Second variable found.	 M1 A1 A1	No marks for 'trial and improvement'. No marks for unsupported answers. Answer lines take precedence. FT 'their equation' from (a) if of equivalent difficulty (e.g. both the coefficients of x and y are ≠ 0 and ≠ 1). Allow one error in one term (not the term with equal coefficients). CAO FT substitution of their '1st variable' evaluated correctly, provided M1 gained. If **both** correct answers are seen in working space, but contradicted on answer lines, award M1A1A0. Treat reversed answers as a slip (M1A1A1).