REVISE
.wales

F2.10 — Linear equations & simple inequalities

Mark schemes for the F2.10 question pack

Spec 2.2.1, 2.2.3 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 62 questions in the corresponding revise.wales question pack (112 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

7. (a) (i) (x=) 8		B1	Accept embedded answers Mark final answer
7. (a) (ii) (y=) 64		B1`	Accept embedded answers Mark final answer
7.(b) 4k		B1	

e.g. 'power must be even', '25 is odd' etc.				Do not accept e.g. 'should be 2^{5}', 'it isn't even'.
13.(a)	$y = -x + 2$		B1	
13.(b)	(2, 5)		B1	
13.(c)	$\frac{2}{3}$		B1	

			B1 for a denominator of 20 in a fraction < 1.
17.			*No marks for 'trial and improvement'.*
Method to eliminate variable e.g. equal coefficients with intention to <u>appropriately</u> add or subtract'	✓	M1	Allow 1 error in one term, not one with equal coefficients.
First variable found $x = 5$ or $y = -2$.	✓	A1	C.A.O.
Substitute to find the 2nd variable.	✓	m1	F.T. their '1st variable'.
Second variable found	✓	A1	

7.(a) (x =) 7	B1	Allow embedded answer. Mark final answer.
7.(b) (x =) 19	B1	Allow embedded answer. Mark final answer.
7.(c) (x =) 6	B1	Allow embedded answer. Mark final answer.

				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

			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 $f = -4$.

		equations shown.
19.(a) Tan ACB = $\frac{6{\cdot}5}{10{\cdot}4}$ (ACB =) $\tan^{-1}$ 0·625 or $\tan^{-1}$ (6·5 / 10·4) (x) = 32(°)	M1 A1 A1	M1 for equivalent complete method. C.A.O. (Implies previous A1.) Accept an answer that rounds to 32(°)
Alternative method. ***Correct** use of 'two-step' method.* *(x) = 32(°)*	M2 A1	*A partial trigonometric method is M0.* *Accept an answer that rounds to 32(°)*
19.(b) (DE =) 9·4 × sin[22 + 32](°) = 7·6(…)(cm) ISW	M2 A1	FT 22° + 'their 32°'. M0 for using sin22° or sin 'their 32°' alone. M1 for $\frac{DE}{9{\cdot}4}$ = sin54(°) If no marks awarded SC1 for a correct answer (1dp) using their clearly stated or shown angle (D)C(E), but not 22° or 'their 32°'.
Alternative method. ***Correct** use of 'two-step' method.* *(DE) = 7·6(…)(cm) ISW*	M2 A1	*A partial trigonometric method is M0.*

			between 10·2 and 11·4 inclusive.
3.(a)	8x − 6y or 2(4x – 3y)	B2	Must be in an expression for B2. B1 for sight of (+)8x or −6y. B1 for 8x + −6y Mark final answer.
3.(b)	2m = 19 m = 9½ or 19/2 or 9·5	B1 B1	 FT from 2m = k. Accept m = k/2 (but, if on FT k is even, final answer must be given as a whole number.) B0 for '9 rem 1'. Mark final answer. Allow 2 marks for embedded answer BUT only 1 mark if contradicted by m ≠ 9½.
3.(c)	1	B2	B1 for sight of −20 or sight of (+)21. But not −20f (+)21g. Mark final answer.

5. (ABC or BAC =) $\frac{180 - 76}{2}$ = 52(°)	M1 A1	Angles may be shown on the diagram.
(CBP = 180 – 52 =) or (CBP = 76 + 52 =) 128(°)	B1	F.T. 'their derived, stated or shown 52' BUT not 76.
Organisation and Communication.	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical
Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc

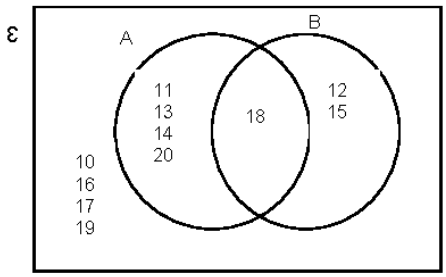
8.(a)	a = 52° b = 52° c = 64°	B1 B1 B1	 OR FT b = 'their a'.
8.(b)	x = 64°	B1	OR FT x = 'their c'.
	y = 64°	B1	OR FT y = 180 – 52 – 'their x'. OR FT y = 180 – 64 – 'their a' OR FT y = 180 – 'their a' – 'their c' OR FT y = 180 – 'their b' – 'their c'
	Isosceles.	B1	C.A.O. Dependent on values given for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

12. A number 'n' is chosen. $0{\cdot}25 \times n$ (or equivalent) OR $0{\cdot}2 \times n$ (or equivalent) $\div 5$ (or equivalent) OR $\div 4$ (or equivalent) $= \frac{n}{20}$ $= \frac{n}{20}$	M1 m1 A2	 For an **appropriate** 2nd step. A1 for each correct value (C.A.O.). Dependent on both M1 and m1.
If no number 'n' chosen. • 1/5 of 25% = 5% AND 1/4 of 20% = 5% with no further work • 1/5 of 25% = 5 AND 1/4 of 20% = 5 ISW • 1/5 of 25% = 5% OR 1/4 of 20% = 5% ISW		Award SC4 SC2 SC1 No marks for showing just one of the following. 1/5 of 25% = 5 OR 1/4 of 20% = 5

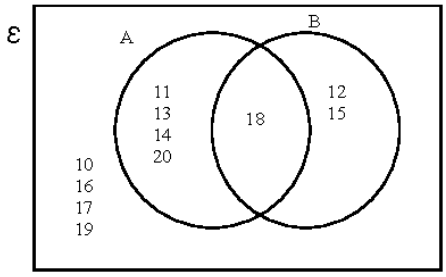
12.(a) −5 11	B2	B1 for each. Table takes precedence if conflicting values given.
12.(b) At least 6 correct plots and no incorrect plot.	P1	F.T. 'their (−2,−5)' and 'their (2,11)' OR (−2,−5) and (2,11) plotted. Allow ± '½ a small square'. Ignore any plots that can not be shown e.g. (−2,−13).
A smooth curve drawn through their plots.	C1	F.T. 'their plots'. OR a curve through the 6 given points and (−2,–5) and (2,11). Allow intention to pass through their plots. (± 1 small square horizontal or vertical.)
12.(c) Line y = 2 drawn	L1	Must be at least 2cm long.
−4·65 AND 0·65	B1	F.T. intersection of 'their curve' with 'their $y = 2$' only if exactly two points of intersection. Allow ± '1 small square'.

14.(a)	8x − 6y or 2(4x – 3y)	B2	Must be in an expression for B2. B1 for sight of (+)8x or −6y. B1 for 8x + −6y Mark final answer.
14.(b)	2m = 19 m = 9½ or 19/2 or 9·5	B1 B1	FT from 2m = k. Accept m = k/2 (but, if on FT k is even, final answer must be given as a whole number.) B0 for '9 rem 1'. Mark final answer. Allow 2 marks for embedded answer BUT only 1 mark if contradicted by m ≠ 9½.
14.(c)	1	B2	B1 for sight of −20 or sight of (+) 21. But not – 20f (+) 21g. Mark final answer.

15.(a)	$\frac{1}{2}$	B1	
15.(b)	-3	B1	
15.(c)	(5, 2)	B1	

5.(a) Any correct total of **2**. e.g. 3 + 3 + 3 − 7	B1	B0 if any numbers other than 3 and 7 used. B0 if any operation other than + or – used. e.g. 3 × 3 is not acceptable for 3 + 3 + 3. Allow multi-digit numbers made from 3 or/and 7. e.g. 33, 37, 373 etc.
5.(b) Any correct total of **8**. e.g. 7 − 3 + 7 − 3	B1	B0 if any numbers other than 3 and 7 used. B0 if any operation other than + or – used. e.g. 2 × 7 is not acceptable for 7 + 7. Allow multi-digit numbers made from 3 or/and 7. e.g. 33, 37, 373 etc.
5.(c) Any correct total of **19**. e.g. 3 + 3 +3 + 3 +7	B1	B0 if any numbers other than 3 and 7 used. B0 if any operation other than + or – used. e.g. 4 × 3 is not acceptable for 3 + 3 + 3 + 3. Allow multi-digit numbers made from 3 or/and 7. e.g. 33, 37, 373 etc.
6.  	 B1 B1 B2 B1	*Allow intent of drawing circles and a rectangle.* Two intersecting circles AND labelled A and B AND within a rectangle. Allow missing 'ε' symbol. For unambiguous indication that the set B consists of 12, 15 and 18 only. B0 if any of these numbers are repeated outside B. All eleven numbers in correct position (with or without a rectangle), with no other or repeated numbers. B1 for six to ten numbers in correct position. Repeated numbers should not be credited. Other numbers may be ignored for this B1 mark.
7.(a) 5(2a - 3)	B1	Mark final answer.
7.(b)(i) (x =) 147	B1	Accept embedded answer. Mark final answer.
7.(b)(ii) 13f – 6f = 5 − 2 7f = 3 (f =) 3/7	 B1 B1 B1	F.T. until 2nd error. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. Mark final answer. Allow 0·43 or 0·429 or 0·428… as a final answer.
7.(c) '5n – 3 can be even or odd' ticked or implied AND a valid explanation given. e.g. '5×3 – 3 = 12 (even) and 5×4 – 3 = 17 (odd)' 'if n is odd you get even (but) if n is even you get odd'	E1	A valid explanation implies '5n – 3 can be even or odd', unless contradicted. Allow e.g. '15 – 3 =12, 20 – 3 = 17'. Allow a correct sequence shown e.g. 2, 7, 12, …. Do not accept 'n can be anything', 'n can be odd or even'. Do not accept an explanation that only uses 5n. e.g. '5 × 2 = 10 (even), 5 × 3 = 15 (odd)'

<table>
<tr><td>8(a) $5p$</td><td>B1</td><td></td></tr>
<tr><td>8(b) (i) (x =) 8</td><td>B1</td><td>Accept embedded answer</td></tr>
<tr><td>8(b) (ii) (y =) 15</td><td>B1</td><td>Accept embedded answer</td></tr>
<tr><td>8(c) 19</td><td>B1</td><td>Accept 4 x 19 (= 76) or 19 x 4 (= 76)</td></tr>
<tr><td>9.
<table>
<tr><td>23 – (4 + 2) × 3 = 5</td><td>TRUE</td><td></td></tr>
<tr><td>7/10 + 2/5 = 9/15</td><td></td><td>FALSE</td></tr>
<tr><td>½ of 1/8 = 1/4</td><td></td><td>FALSE</td></tr>
<tr><td>25% of 0·4 = 0·1</td><td>TRUE</td><td></td></tr>
<tr><td>28 – 3 × 2 + 5 = 55</td><td></td><td>FALSE</td></tr>
</table></td><td>B3</td><td>For all 5 correct
B2 for 4 correct.
B1 for 3 correct</td></tr>
<tr><td>10.(a)
<table>
<tr><td rowspan="2">Type</td><td colspan="2">Yellow</td><td colspan="2">Blue</td></tr>
<tr><td><100</td><td>≥100</td><td><100</td><td>≥100</td></tr>
<tr><td>Num.</td><td>(8)</td><td>7</td><td>4</td><td>6</td></tr>
</table></td><td>B2</td><td>For all three correct.
B1 for 1 or 2 correct.
If no marks awarded allow B1 for all correct tallies seen.</td></tr>
<tr><td>10.(b) Any valid statement that indicates that the numbers (in the table) are added (to make 25) e.g. ‘add the frequency’.</td><td>E1</td><td>Allow ‘add them up’.
Allow sight of ‘8 + 7 + 4 + 6 (= 25).’</td></tr>
<tr><td>10.(c) $\frac{8}{25}$ or equivalent ISW</td><td>B2</td><td>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’.</td></tr>
<tr><td>11.(a) −3
1</td><td>B1
B1</td><td>OR FT ‘their −3’ + 4.</td></tr>
<tr><td>11.(b)(i) 21</td><td>B1</td><td></td></tr>
<tr><td>11.(b)(ii) 191</td><td>B1</td><td></td></tr>
<tr><td>11.(c) Divide (the previous number) by 3.</td><td>E1</td><td>Allow ‘÷3’.
Do not accept n÷3.</td></tr>
</table>

12.(a) Any correct total of **2**. e.g. 3 + 3 + 3 − 7	B1	B0 if any numbers other than 3 and 7 used. B0 if any operation other than + or – used. e.g. 3 × 3 is not acceptable for 3 + 3 + 3. Allow multi-digit numbers made from 3 or/and 7. e.g. 33, 37, 373 etc.
12.(b) Any correct total of **8**. e.g. 7 − 3 + 7 − 3	B1	B0 if any numbers other than 3 and 7 used. B0 if any operation other than + or – used. e.g. 2 × 7 is not acceptable for 7 + 7. Allow multi-digit numbers made from 3 or/and 7. e.g. 33, 37, 373 etc.
12.(c) Any correct total of **19**. e.g. 3 + 3 +3 + 3 +7	B1	B0 if any numbers other than 3 and 7 used. B0 if any operation other than + or – used. e.g. 4 × 3 is not acceptable for 3 + 3 + 3 + 3. Allow multi-digit numbers made from 3 or/and 7. e.g. 33, 37, 373 etc.
13.  	B1 B1 B2	*Allow intent of drawing circles and a rectangle.* Two intersecting circles AND labelled A and B AND within a rectangle. Allow missing 'ε' symbol. For unambiguous indication that the set B consists of 12, 15 and 18 only. B0 if any of these numbers are repeated outside B. All eleven numbers in correct position (with or without a rectangle), with no other or repeated numbers. B1 for six to ten numbers in correct position. Repeated numbers should not be credited. Other numbers may be ignored for this B1 mark.
14.(a)(i) (x =) 147	B1	Accept embedded answer. Mark final answer.
14.(a)(ii) 13f – 6f = 5 − 2 7f = 3 (f =) 3/7	 B1 B1 B1	F.T. until 2nd error. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. Mark final answer. Allow 0·43 or 0·428… as a final answer.
14.(b) '5n – 3 can be even or odd' ticked or implied AND a valid explanation given. e.g. '5×3 – 3 = 12 (even) and 5×4 – 3 = 17 (odd)' 'if n is odd you get even (but) if n is even you get odd'	E1	A valid explanation implies '5n – 3 can be even or odd', unless contradicted. Allow e.g. '15 – 3 = 12, 20 – 3 = 17'. Allow a correct sequence shown e.g. 2, 7, 12, …. Do not accept 'n can be anything', 'n can be odd or even'. Do not accept an explanation that only uses 5n. e.g. '5 × 2 = 10 (even), 5 × 3 = 15 (odd)'

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.

	−1(°C)	B1	
2.	Showing (7%), 60% and 30% OR 7/100 , 60/100 and 30/100 OR 0·07, 0·6 and (0·3) OR three correct calculations for a common amount.	B2	B2 for all correct %, OR all correct fractions with a common denominator, OR all correct decimals OR correct work using a common amount, OR a valid combination that allows full comparison. B1 for one correct conversion that still allows a **full comparison**. (i.e. allow one error in attempt at a **common format**.)
	7% 0·3 3/5 in order	B1	Allow any unambiguous indication (e.g. 'converted' values.) **Strict FT** of 'their work' if at least B1 gained. Correct answer, with no other marks awarded, gains

7.(a)(i) (x =) 8	B1	Accept embedded answer. Mark final answer.
7.(a)(ii) (x =) 14	B1	Accept embedded answer. Mark final answer.
7.(b)(i) $8n$	B1	Mark final answer.
7(b)(ii) $m - 3$	B1	Mark final answer.

			Pull (=) Join OR (scale =) FT 36
8.(a)(i)	(x =) 36	B1	Accept embedded answer unless contradicted by $x \neq 36$. Mark final answer.
8.(a)(ii)			F.T. until 2nd error. Adding 'unlike terms' eg $12x + 8 = 20x$ or $3x + 2 = 5x$ to be taken as two errors.
	$12x + 8 = 12$ OR $3x + 2 = 3$	B1	
	$12x = 4$ OR $3x = 1$	B1	
	$x = \frac{4}{12}$ OR $x = \frac{1}{3}$	B1	Mark final answer. Allow 0·33(33..) A final answer of 0·3 is (B1B1)B0.
8(b)(i)	7(2a + 3)	B1	
8(b)(ii)	f(f − 1)	B1	

10. $(x =) \frac{360 - 120}{4}$	M2	M1 for $4x + 120 = 360$ OR for $(4x =) 360 - 120$ OR for sight of 240 OR for $\frac{\text{'their 360'} - 120}{4}$, where 'their 360' > 120 M0 for $\frac{120}{4}$
$(x =) 60$	A1	CAO

19.(a) $(x + 7)(x - 3)$ $(x =) -7$ AND $(x =) 3$	B2 B1	B1 for $(x \ldots 7)(x \ldots 3)$. Strict FT from their brackets. Allow the following. B2 for $x + 7 (=0)$ AND $x - 3 (=0)$ (B1) $(x =) -7$ AND $(x =) 3$ (B1) B1 for $x - 7 (=0)$ AND $x + 3 (=0)$ (B0) $(x =) 7$ AND $(x =) -3$ (B1) FT B1 if only $(x =) -7$ AND $(x =) 3$ seen. (B1)
19.(b) Correct method for clearing all three fractions. Accurate clearing of fractions AND expansion of brackets on lhs. $24x = 36$ or equivalent. $x = \frac{36}{24}$ or equivalent	M1 A1 A1 A1	FT until 2nd error. May be seen in stages. Allow if all over a common denominator. May be seen in stages For collection of terms. FT from 'their $ax = b$' ONLY if M1 gained AND no more than one previous error. If no marks, allow SC1 for sight of $\frac{2(2x - 3) + 5(4x + 5)}{(10)}$ or equivalent. If FT answer is a whole number then it must be shown as an integer. Allow a correct embedded answer of 1·5 or 1½ BUT Penalise −1 if followed by $x \neq 1{\cdot}5$ or 1½. Note : An answer of 1·5 that is found without gaining M1 OR that is not embedded is zero marks.

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 1 Intermediate Tier		Mark	Comments
1.(a)	20(:)18 OR 8(:)18 p.m.	B1	B0 for (0)8:18 or 8:18 a.m or 20:18 a.m. Allow 20(:)18 p.m. and 08:18 p.m.
1.(b)	6 (hours) 40 (minutes)	B1	
1.(c)	265 (seconds)	B2	B1 for sight of 435 AND 170 OR B1 for sight of 300 AND 35 OR B1 for 4 minutes 25 seconds.
2.(a)	Line x = −4 drawn	B1	Line must be at least 2 units long. B0 if 'extra' lines drawn unless correct line unambiguously identified.
2.(b)(i)	Point C shown at (−2,−4)	B2	Allow B2 if point C not labelled but is unambiguously at the correct position (eg 'end of line') Otherwise, B1 if Point C at (−2,y) y≠3. (BÂC = 90°) SC1 for point C at (5,−4).
2.(b)(ii)	(−2,−4)	B1	FT 'their unambiguously identified position of point C'. Allow missing brackets.
3.(a)(i)	2700	B2	B1 for sight of 27 OR sight of 100. Mark final answer.
3.(a)(ii)	0·08	B1	Mark final answer
3.(a)(iii)	Correctly using a common denominator. 13 or equivalent. 18	M1 A1	Mark final answer.
3.(b)	0·05	B1	
4.	<table><tr><td>Answer</td><td>Yes</td><td>No</td><td>Not sure</td></tr><tr><td>Number of students</td><td>150</td><td>50</td><td>100</td></tr></table>	 B3	B1 for (Yes =) 150 C.A.O. B2 for (No =) 50 AND (Not sure =) 100. or FT 'their Yes' for (No =) ⅓(300 − 'Yes') AND (Not sure =) ⅔(300 − 'Yes') If B2 not gained, then B1 for (No =) 50 OR (Not sure =) 100 or FT 'their Yes' for (No =) ⅓(300 − 'Yes') OR (Not sure =) ⅔(300 − 'Yes') or B1 for 'No' + 'Not sure' = 150 or B1 if 'Not sure' = 2 × 'No'. or B1 for 'Yes' + 'No' + 'Not sure' = 300.
5.(a)	4x = 10 − 7 (=3) x = 3/4 or equivalent.	B1 B1	 FT from 4x = b. Integer answer required if b is a multiple of 4 Mark final answer. Allow an embedded answer eg 4 × 0·75 + 7 = 10 for B2, but penalise −1 if contradicted by x ≠ 0·75
5.(b)	5d − 2e	B2	Must be an expression for B2. B1 for sight of (+)5d OR sight of − 2e. B1 for 5d + − 2e. Mark final answer.
6.	a = 113 b = 67 c = 113	B1 B1 B1	C.A.O. OR FT 180 − 'their a'. OR FT = 'their a' OR FT 180 − 'their b'.
7.	AB = 13 (cm) (Area =) 13 × 13 = 169 (cm²)	B1 M1 A1	For any indication that side of square = 13 (cm). May be seen on the diagram. No FT (but note SC1). C.A.O. Unsupported 169 (cm²) gains all 3 marks. If no marks gained award SC1 for a final answer of144 (cm²)

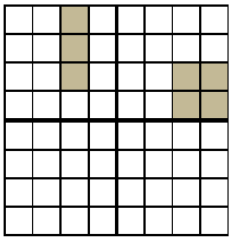
WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 1 Intermediate Tier		Mark	Comments
1.(a)	20(:)18 OR 8(:)18 p.m.	B1	B0 for (0)8:18 or 8:18 a.m or 20:18 a.m. Allow 20(:)18 p.m. and 08:18 p.m.
1.(b)	6 (hours) 40 (minutes)	B1	
1.(c)	265 (seconds)	B2	B1 for sight of 435 AND 170 OR B1 for sight of 300 AND 35 OR B1 for 4 minutes 25 seconds.
2.(a)	Line x = −4 drawn	B1	Line must be at least 2 units long. B0 if 'extra' lines drawn unless correct line unambiguously identified.
2.(b)(i)	Point C shown at (−2,−4)	B2	Allow B2 if point C not labelled but is unambiguously at the correct position (eg 'end of line') Otherwise, B1 if Point C at (−2,y) y≠3. (BÂC = 90°) SC1 for point C at (5,−4).
2.(b)(ii)	(−2,−4)	B1	FT 'their unambiguously identified position of point C'. Allow missing brackets.
3.(a)(i)	2700	B2	B1 for sight of 27 OR sight of 100. Mark final answer.
3.(a)(ii)	0·08	B1	Mark final answer
3.(a)(iii)	Correctly using a common denominator. $\frac{13}{18}$ or equivalent.	M1 A1	Mark final answer.
3.(b)	0·05	B1	
4.	<table><tr><td>Answer</td><td>Yes</td><td>No</td><td>Not sure</td></tr><tr><td>Number of students</td><td>150</td><td>50</td><td>100</td></tr></table>	 B3	B1 for (Yes =) 150 C.A.O. B2 for (No =) 50 AND (Not sure =) 100. or FT 'their Yes' for (No =) ⅓(300 − 'Yes') AND (Not sure =) ⅔(300 − 'Yes') If B2 not gained, then B1 for (No =) 50 OR (Not sure =) 100 or FT 'their Yes' for (No =) ⅓(300 − 'Yes') OR (Not sure =) ⅔(300 − 'Yes') or B1 for 'No' + 'Not sure' = 150 or B1 if 'Not sure' = 2 × 'No'. or B1 for 'Yes' + 'No' + 'Not sure' = 300.
5.(a)	4x = 10 − 7 (=3) x = $\frac{3}{4}$ or equivalent.	B1 B1	 FT from 4x = b. Integer answer required if b is a multiple of 4 Mark final answer. Allow an embedded answer eg 4 × 0·75 + 7 = 10 for B2, but penalise −1 if contradicted by x ≠ 0·75
5.(b)	5d − 2e	B2	Must be an expression for B2. B1 for sight of (+)5d OR sight of − 2e. B1 for 5d + − 2e. Mark final answer.
6.	a = 113 b = 67 c = 113	B1 B1 B1	C.A.O. OR FT 180 − 'their a'. OR FT = 'their a' OR FT 180 − 'their b'.
7.	AB = 13 (cm) (Area =) 13 × 13 = 169 (cm^2)	B1 M1 A1	For any indication that side of square = 13 (cm). May be seen on the diagram. No FT (but note SC1). C.A.O. Unsupported 169 (cm^2) gains all 3 marks. If no marks gained award SC1 for a final answer of144 (cm^2)

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

WJEC GCSE MATHEMATICS

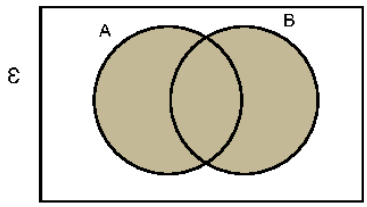
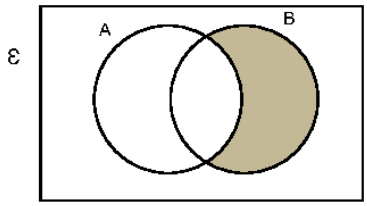
AUTUMN 2020 MARK SCHEME

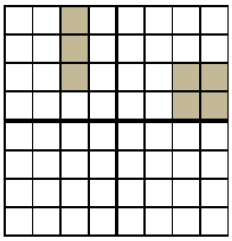
GCSE Mathematics Unit 1: Foundation Tier	Mark	Comments
1. (a) Angle of 35° drawn at A	B1	Accept 33° to 37° Point alone is not sufficient.
1.(b) Circle radius 7cm (diameter 14 cm)	B1	Accept radius 6.8 (cm) to 7.2 (cm)
2.(a) 5433	B1	
2.(b) 174	B1	
2.(c) 75	B1	
2.(d) 6 × 7 ÷ 2 = 21	M1 A1	If no marks, award 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.

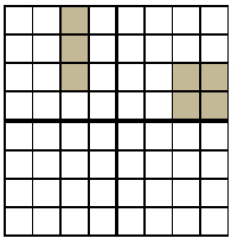
9.(d) $4x = 10 - 7\ (=3)$ $x = \frac{3}{4}$ or equivalent.	B1 B1	FT from $4x = b$. Integer answer required if b is a multiple of 4 Mark final answer. Allow an embedded answer eg $4 \times 0{\cdot}75 + 7 = 10$ for B2, but penalise −1 if contradicted by $x \neq 0{\cdot}75$
10. (Factors of) 16, OR 32, OR 64, … (Multiples of) 4	B1 B1	Accept any multiple of 16 which does not have a factor of 3.
11. 9, 13 and 14 OR 10, 13 and 15 OR 11, 13 and 16 OR 12, 13 and 17	B2	Allow in any order. B1 for 3 whole numbers with a median of 13 OR B1 for 3 whole numbers with a range of 5 Penalise -1 for any repeated numbers. e.g. 8, 13, 13 gains B2 -1 = B1 13, 13, 13 gains B1 -1 = B0.
12.  (Perimeter =) 8×7 + 2×3 (cm) or equivalent (Perimeter =) 62 (cm)	B1 M1 A1	May be implied by correct method which would lead to an answer of 62 (cm). (This is the only diagram which can gain B1.) If no diagram, then B1 M1 A1 for correct calculation which leads to answer of 62 (cm). FT these large rectangles only:  B0 (Perimeter =) 8x3 + 2x7 (cm) or equivalent M1 (Perimeter =) 38 (cm) A1 OR  B0 (Perimeter =) 4x7 + 4x3 (cm) or equivalent M1 (Perimeter =) 40 (cm) A1 If no diagram, allow SC1 for (8x3 + 2x7 or equivalent) = 38 (cm) OR (4x7 + 4x3 or equivalent) = 40 (cm).
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.
13.(a) 20(:)18 OR 8(:)18 p.m..	B1	B0 for (0)8:18 or 8:18 a.m. or 20:18 a.m. Allow 20(:)18 p.m. and 08:18 p.m.

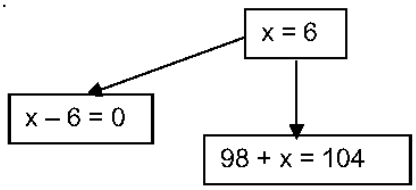
10.(a) $\frac{1}{6} \times \frac{1}{4}$ or equivalent $= \frac{1}{24}$ ISW	M1 A1	 Accept 0·0416... or 0·0417 or 0·042 for M1A1 M1A0 for '1 in 24', '1:24'.
10.(b) $\frac{1}{5} + \frac{1}{10}$ or equivalent. $= \frac{3}{10}$ or equivalent. ISW	M1 A1	
11. $(AC^2 =)\ 10{\cdot}8^2 + 14{\cdot}4^2$ $AC^2 = 324$ or $(AC =) \sqrt{324}$ $(AC =)$ 18(cm) (Area ACD =) $\frac{24 \times 18}{2}$ $= 216\ (cm^2)$	M1 A1 A1 M1 A1	Accept equivalent of using cos rule (as cos 90 = 0). F.T. $\sqrt{}$'their 324' provided M1 gained. Final answer of AC = 324 is M1A0A0. *Alternative method to find AC* *A correct and complete method (using two trigonometric relationships)* *M2* *AC = 18(cm)* *A1* FT 'their stated AC'. (May be shown on the diagram) Accept equivalent of using ½ × 24 × 18 × sin 90 (as sin 90 = 1).
12. One correct evaluation $7{\cdot}2 \le x \le 7{\cdot}3$ 2 correct evaluations $7{\cdot}275 \le x \le 7{\cdot}295$, one < 0, one > 0. 2 correct evaluations $7{\cdot}275 \le x \le 7{\cdot}285$, one < 0, one > 0. $x = 7{\cdot}28$	 B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if negative or positive. If evaluations not seen accept 'too high' or 'too low'.* *Look out for equating $x^3 - 5x = 350$* x $x^3 - 5x - 350$ 7·2 −12·75(2) 7·21 −11(·2..) 7·22 − 9(·7...) 7·23 − 8(·2...) 7·24 − 6(·6...) 7·25 −5(·1...) 7·26 − 3(·6...) 7·275 −1(·3....) 7·27 − 2(·1...) 7·284 0(·04..) **7·28** **−0·5(7..)** **7·285** **0·1(9..)** **7·29** **0·9(7..)** 7·295 1(·7....) 7·3 2·5(17)
13.(a) an expression	B1	
13.(b) an equation	B1	
14. (Mid-points) 2·5, (7·5), 12·5 and 17·5. $8 \times 2{\cdot}5 + (0 \times 7{\cdot}5) + 7 \times 12{\cdot}5 + 5 \times 17{\cdot}5$ (20 + 0 + 87·5 + 87·5 = 195) ÷ 20 = 9.75	B1 M1 m1 A1	Allow for sight of mid-points. F.T. 'their mid-points' including bounds, provided they fall within the classes (including lower and upper bounds and used consistently). C.A.O.
15. (x =) $\frac{360}{15}$ or $180 - \frac{(15-2) \times 180}{15}$ or equivalent = 24(°) (BR =) 8 × cos 24 or 8 × sin (90 – 24) = 7·3(0...)(cm) or 7·31(cm)	M1 A1 M2 A1	May be seen in parts. FT 'their stated value for x' (x < 90°) M1 for $\frac{BR}{8}$ = cos 24 or $\frac{BR}{8}$ = sin (90 – 24) Accept equivalent of using sin rule (as sin 90 = 1). *Alternative method to find BR* *A correct and complete method (using two trigonometric relationships and possibly Pythagoras's theorem)* *M2* *BR = 7·3(0...)(cm) or 7·31(cm)* *A1*

13.(b)	6 (hours) 40 (minutes)	B1	
13.(c)	265 (seconds)	B2	B1 for sight of 435 AND 170 OR B1 for sight of 300 AND 35 OR B1 for 4 minutes 25 seconds.
14.(a)	Line x = −4 drawn	B1	Line must be at least 2 units long. B0 if 'extra' lines drawn unless correct line unambiguously identified.
14.(b)(i)	Point C shown at (−2,−4)	B2	Allow B2 if point C not labelled but is unambiguously at the correct position (eg 'end of line'). Otherwise, B1 if Point C at (−2,y) y≠3. (BÂC = 90°) SC1 for point C at (5,−4).
14.(b)(ii)	(−2,−4)	B1	FT 'their unambiguously identified position of point C'. Allow missing brackets.
15.(a)	2700	B2	B1 for sight of 27 OR sight of 100. Mark final answer.
15.(b)	0·08	B1	Mark final answer
15.(c)	Correctly using a common denominator. 13 or equivalent. 18	M1 A1	Mark final answer.
16.	<table><tr><td>Answer</td><td>Yes</td><td>No</td><td>Not sure</td></tr><tr><td>Number of students</td><td>150</td><td>50</td><td>100</td></tr></table>	B3	B1 for (Yes =) 150 C.A.O. B2 for (No =) 50 AND (Not sure =) 100. or FT 'their Yes' for (No =) ⅓(300 − 'Yes') AND (Not sure =) ⅔(300 − 'Yes') If B2 not gained, then B1 for (No =) 50 OR (Not sure =) 100 or FT 'their Yes' for (No =) ⅓(300 − 'Yes') OR (Not sure =) ⅔(300 − 'Yes') or B1 for 'No' + 'Not sure' = 150 or B1 if 'Not sure' = 2 × 'No'. or B1 for Yes + No + Not sure = 300.
17.	a = 113 b = 67 c = 113	B1 B1 B1	C.A.O. OR FT 180 − 'their a'. OR FT = 'their a' OR FT 180 − 'their b'.
18.(Probability of Puffin Island=)1 − 0·4 − 0·15 − 0·25 = 0·2 (Number of cards showing Puffin Island =) 0·2 × 80 = 16		M1 A1 M1 A1	An unsupported answer of 0·56 implies M1 FT 'their stated P(Puffin Island)' × 80, only if 'their stated P(Puffin Island)' < 1. 16/80 is M1A0 unless 16 has been seen.
Alternative method *(Number of cards showing other 3 islands =)* *0·4 × 80 + 0·15 × 80 + 0·25 × 80 or equivalent* *= 64* *(Number of cards showing Puffin Island =) 80 − 64* *= 16*		*M1* *A1* *M1* *A1*	*Allow M1 for sight of 32 AND 12 AND 20.* *FT 80 − 'their derived 64', only if 'their derived 64'<80.* *16/80 is M1A0 unless 16 has been seen.*

12.(a)(i)  	B1	
12.(a)(ii)  	B1	
12.(b) A valid statement. e.g. 'all multiples of 6 are also multiples of 3', 'because 3 goes into 6', '6 is a multiple of 3', '3 is a factor of 6'.	E1	Allow e.g. '(set) C is a subset of (set) A', 'it is a multiple of 3', ' 6, 12, ... are also multiples of 3'.
13. (One part =) (£)210 ÷ 3 = (£)70 (Total amount =) 14 × (£)70 OR (£)210 + 4 ×(£)70 + 7 × (£)70 = (£)980	M1 A1 m1 A1	FT 'their (£)70' only if M1 gained. Allow m1 for sight of 210 AND 280 AND 490 together as the three shares. *For 210 ÷ 3 × 14 M3* *= 980 A1*
14.(a) 9 −7	B2	B1 for each.
14.(b) At least 6 correct plots and no incorrect plot. A smooth curve drawn through their plots.	P1 C1	FT 'their (−2,9)' and 'their (2,−7)' Allow ± '½ a small square'. FT 'their 8 plots'. OR a curve through the 6 given points and (−2,9) and (2,−7). Allow intention to pass through their plots. (± 1 small square horizontal or vertical.)
14.(c) Line y = 1 drawn −0·8 AND 4·8	B1 B1	Must be at least 2cm long. FT intersection of 'their curve' with 'their y = 1' only if exactly two points of intersection and y ≠ 0. If curve drawn, but no line drawn, allow a FT from intersection of 'their curve' with line y = 1 only if exactly two points of intersection for B0B1. Allow ± '1 small square'.
15. 4 5 11 12 OR 4 6 10 12 OR 4 7 9 12	B3	May be written in any order. B1 for Range = 8. B1 for Median = 8. B1 for Total = 32. Penalise −1 **once only** for repeated values, negatives or fractional answers e.g. 4, 8, 8, 12 earns B1 B1 B1 −1 (2 marks), 8, 8, 8, 8 earns B0 B1 B1 −1 (1 mark).

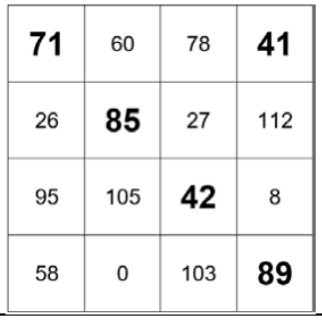
13.(a) 	B2	B1 for each individual shape. Ignore clearly deleted shading. .
13.(b) Reflection (in the line) x = 5	B2	B1 for stating 'Reflection'. Ignore extra wording once 'reflection' (or 'reflected') seen. B1 for stating x = 5 (simply drawing the line is B0)
14.(a) 10x + 15 = 20 OR 2x + 3 = 4 10x = 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]*

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	
= 19·6(…..)(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]*

7. 	B2	B1 for 2 correct answers and 1 incorrect answer B1 for 1 correct answer and 1 incorrect answer B1 for 1 correct answer and 0 incorrect answer
8. **Use** of 360(°), e.g. 8x = 360(°) (x =) 360/8(°) (x =) 45(°)	B1 M1 A1	M1 implies B1 If B0 M0 A0, award SC1 for x = 22.5(°) from accurate working from 8x = 180(°)
9. (Perimeter of rectangle =) 15+15+7+7 = 44 (cm) (Length of side of square =) 44 ÷ 4 (cm) 11 (cm)	M1 A1 M1 A1	FT 'their stated 44', but not 15 or 7.
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) (x =) 180 – 90 – 37 or equivalent. = 53(°)	M1 A1	
10.(b) (a =) 51(°) (b =) 360 – (51 + 82 + 153) or equivalent. = 74(°)	B1 M1 A1	FT 'their 51', i.e. 125 – 'their 51' provided 'their 51' < 125.
11.(a) $\frac{1}{9}$	B1	
11.(b) 0·016	B1	
11.(c) 0·015	B1	
12.(a) $\frac{1}{10}$ or 0·1	B1	Mark final answer.
12.(b) Sight of 27 AND 4 (27 ÷ 4 =) 6·75	B1 B1	FT if at least 27 or 4 correct and of equivalent difficulty (i.e. not leading to a whole number answer). Answer must be a decimal
13. (Volume =) 5 × 3 × 2 = 30 (cm^3)	M1 A1	Any additional calculation e.g. 30 ÷ 2 = 15 is M0.

WJEC GCSE MATHEMATICS

AUTUMN 2021 MARK SCHEME

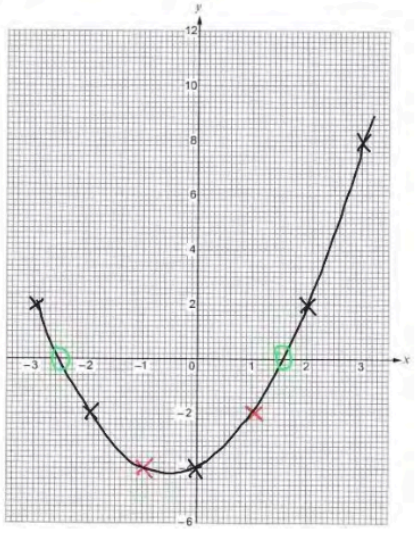
Unit 2: Foundation Tier	Mark	Comments
1.(a) 5169	B1	
1.(b) 6502	B1	
1.(c) 186	B1	
1.(d) 45	B1	
2.(a) 5, 5, 5, 5	B1	
2.(b) Exactly two 3s and any other two numbers	B1	Accept in any order.
2.(c) Exactly one 2 and any other three numbers	B1	Accept in any order.
3.(a) 40 065	B1	
3.(b) 5400	B1	
4.(a) rhombus	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

13. $5x - 17 + 2x + 9 + x + 20 = 180$ $8x = 168$ $x = 21$	M1 A1 A1	F.T. from ax = b. Allow all 3 marks for x = 21.
Substituting x = 21 into at least one expression. (5x – 17 =) 88(°) (2x + 9 =) 51(°) (x + 20 =) 41(°) (So not a right-angled triangle)	M1 A1	If $x \neq 21$ FT 'their derived value of x'. F.T. for this A1 if $x \geq 4$. Any **two** of these expressions correctly evaluated with no incorrect evaluation, provided the sum of the two found is > 90. (statement not required). *Note* *If further work indicates that the values found are not treated as angles (e.g. showing $51^2 + 41^2 \neq 88^2$) then award final M0A0.*
Alternative method *5x – 17 = 90 OR 2x + 9 = 90 OR x + 20 = 90* *x = 21·4 AND x = 40·5 AND x = 70*	*M1* *A2*	*Award A1 for any one of these:* *x = 21·4 OR x = 40·5 OR x = 70*
Then verifying: *If x = 21·4: 5x – 17 + 2x + 9 + x + 20 = 183.2* *AND* *If x = 40·5: 5x – 17 + 2x + 9 + x + 20 = 336* *AND* *If x = 70: 5x – 17 + 2x + 9 + x + 20 = 572* *(So not a right-angled triangle)*	*A2*	*Award A1 for any one of these:* *If x = 21·4: 5x – 17 + 2x + 9 + x + 20 = 183.2* *OR* *If x = 40·5: 5x – 17 + 2x + 9 + x + 20 = 336* *OR* *If x = 70: 5x – 17 + 2x + 9 + x + 20 = 572*
14. (AB =) 13·8 × cos 41 OR 13·8 × sin 49 = 10·4(…) (cm)	M2 A1	M1 for $\cos 41 = \frac{AB}{13·8}$ OR $\sin 49 = \frac{AB}{13·8}$
Alternative method: ***Correct** use of 'two-step' method.* *(AB) = 10·4(…)(cm)*	*M2* *A1*	*A partial trigonometric method is M0.* *Accept an answer that rounds to 10·4(cm)*
15.a(i) $x^3 + 7x$	B2	B1 for sight of x^3 + ……. OR ……+ 7x. Do not accept x×x×x + x×7 etc. Mark final answer.
15(a)(ii) $3x^2 - 4x - 15x + 20$ $3x^2 - 19x + 20$	B1 B1	Must be an expression. FT from an error in only one term (out of 4) only if of the form $ax^2 \pm bx \pm cx \pm d$.
15.(b)(i) $5n - 27 < n$ OR $n > 5n - 27$	B2	Allow B2 for an equivalent correct inequality. e.g. $4n - 27 < 0$. B1 if ≤ or ≥ used in a 'correct' inequality. OR B1 for $5n - 27 > n$ OR $n < 5n - 27$
15.(b)(ii) $4n < 27$ $n < \frac{27}{4}$ (Greatest number of clocks =) 6	B1 B1 B1	FT 'their inequality' if of equivalent difficulty. FT only from an < b OR an ≤ b OR an > b OR an ≥ b. FT only from n < c where c is positive OR n ≤ d where d is positive and not an integer An answer of 6 gains all 3 marks.

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.

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.

7.(a) 3a	B1	
7.(b)(i) (y=) 63	B1	Accept embedded answer
7.(b)(ii) (x=) 12	B1	Accept embedded answer
7 (c) 6	B1	

11.(a) –4 –2	B2	B1 for each
11. (b) At least 5 correct plots and no incorrect plot. A smooth <u>curve</u> drawn through their plots. 	P1 C1	FT 'their (–1,–4)' and 'their (1,–2)' Allow ± '½ a small square'. FT 'their 7 plots' OR a curve through the 5 given points **AND** (–1,–4) and (1,–2). Allow the intention to pass through their plots (within 1 small square, either horizontally <u>or</u> vertically of the point).
11. (c) –2·6 AND 1·6	B1	<u>Strict</u> FT 'their curve' only if exactly two points of intersection with the x-axis. Answers must be written to one decimal place. Allow ± 'up to but not including 1 small square'.

4. (d) <u>Alternative Method 1</u>		
(Expected number of winners = 7/12 × 228) 133 (winners)	B1	If 7/12 or correct % or decimal seen in part (c), it must be used for this B1. FT 'their 7/12' if less than 1 × 228. Allow 133/228 or '133 out of 228'. Must be whole number. Award B0 for 7/12 × 228 = 0·58(333…) × 228 = 132 winners. Award B0 for 7/12 × 228 = 0·6 × 228 = 136 or 137 winners.
(Expected number that don't win = 228 – 133) 95 (non-winners)	B1	FT 228 – 'their 133' (provided < 228).
(Amount taken = 95 × £2.50 =) (£)237.5(0)	B1	FT £2.50 × 'their 95' provided < 133.
(Expected profit = 95 × £2.50 – 133 × £1 =) (£)104.5(0)	B1	(£)237.5(0) – (£)133 FT 'their (£)237.5(0)' – 'their (£)133'. Award B1B1B1B0 for sight of 95 × £2.50 – 133 × £1 with an incorrect final answer. If the FT results in a loss, the 'Loss' must be stated, or the answer left as a negative.

11. $(BC^2 =)\ 9{\cdot}6^2 + 12{\cdot}8^2$ or equivalent	M1	note: $(BC^2 =)\ 92{\cdot}16 + 163{\cdot}84$ (ignore place values for M1) *Award M1 for the correct values substituted into the Cosine rule.*
$(BC^2 =)\ 256$ or $(BC =)\ \sqrt{256}$	A1	
$(BC =)\ 16$ (cm)	A1	Allow $(BC =)\ \pm 16$ (cm). FT from M1 for the correctly evaluated square root of 'their 256' provided their answer > 12·8.
$CD = 2 \times 60 \div 16$ or equivalent	M2	FT 'their derived BC' **OR** 'their stated 16' (not derived) provided 12·8 < 'their stated 16' < 22·4. Award M1 for $60 = \frac{1}{2} \times 16 \times CD$ or equivalent.
(CD =) 7·5 (cm)	A1	Allow M2A1 for a correct embedded answer BUT M2A0 if contradicted by CD ≠ 7·5 (cm).

17. $8x + 3x = 17 + 38$ OR $-17 - 38 = -8x - 3x$ $11x = 55$ OR $-55 = -11x$ $x = 5$	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. Allow B1B1B1 for a correct embedded answer BUT only B1B1B0 if contradicted by $x \neq 5$

4. Choice of length, width and height such that length × width × height = 12 i.e. 12 × 1 × 1 6 × 2 × 1 4 × 3 × 1 3 × 2 × 2	B1	Must be whole numbers for B1. May be seen in any order. Award B1 if length, width and height are not stated but implied by the cuboid drawn.
Correct cuboid drawn	B2	Ignore orientation of cuboid. FT 'their length, width and height'. For B2, their cuboid must have edges along or parallel to the 3 directions usually associated with isometric paper (the two diagonals and the vertical). Award B1 for one of the following: • any one edge dealt with correctly for all its three visible occurrences in a cuboid • a cuboid drawn with volume 12cm^3 with a different length, width and height stated on answer line (e.g. 3 × 2 × 2 stated on answer lines, but 6 × 2 × 1 cuboid drawn). For any mark to be awarded the line must go 'through the dots' AND have both ends 'on a dot'. Ignore attempt at handling 'hidden lines'.

10.(a)	$\frac{21{\cdot}76}{32}$ (× 100%) or equivalent	M1	Allow 0·68 to imply M1.
	= 68 (%)	A1	
10.(b)	$5t - 3t = 14 - 3$ OR $3 - 14 = 3t - 5t$	B1	FT until 2nd error.
	$2t = 11$ OR $-11 = -2t$	B1	
	$t = \frac{11}{2}$ or equivalent	B1	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.

14. *(a)* Any valid explanation or counter example e.g. "2 is a prime" "2 is even" "2 is not odd"	E1	Do not accept 2 alone The number 2 must appear in the explanation.
14. *(b)* Any valid explanation or counter example e.g. "8 is a cube" "64 is even"	E1	Do not accept number alone, but allow e.g. $2^3 = 8$ A numerical example must appear in the explanation. If a numerical example is given it must be correct or not contradicted e.g. "2 × 2 × 2 = 16 is even" would be awarded E0 "2 × 2 × 2 is even" would be awarded E1. If two examples are given, one must be correct for E1 If no marks awarded in (a) and (b), award SC1 for correct number only in **both** parts e.g. 2 in (a) **AND** 8 (or any other even cube) in (b)

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.

7.(b) square	B1	
8.(a)(i) subtract eleven (from the previous term)	B1	Accept 'take away 11', '– 11' or '73 - 11n'. B0 for $n - 11$.
8.(a)(ii) multiply (previous term) by four	B1	Accept 'times by 4' or '× 4'. B0 for $n \times 4$
8.(b)(i) (x =) 31	B1	Accept embedded answers, unless contradicted.
8.(b)(ii) (x =) 193.1	B1	Accept embedded answers, unless contradicted.

10. Correct plots of 3 or 4 of the points A, B, C, D AND no incorrect plots. Length = 8 (cm) AND Width = 6 (cm) (Perimeter = 2 × 8 + 2 × 6 or equivalent =) 28 (cm)	 B3 B1 B1	A correct and unambiguous length (8 cm) and width (6 cm) implies the first B3B1 B2 for either • three correct plots and one incorrect plot OR • two correct plots and no more than two incorrect plots B1 for either • one correct plot and no more than three incorrect plots OR • consistent use of reverse coordinates and no other plots The length (8 cm) AND width (6 cm) may be seen in either order. A correct and unambiguous length (8 cm) and width (6 cm) implies the first B3, if not previously awarded. FT from their plots only if a single rectangle has been formed or if three points are plotted and they form a right angle when joined. FT 2×'their 8' + 2×'their 6', provided previous B1 awarded. OR FT 2×'their stated 8' + 2×'their stated 6', provided a rectangle seen or implied
Alternative method ***(if no plots shown)*** *(Length =) 3 – (– 5) OR 3 + 5 = 8 (cm)* *(Width =) 4 – (– 2) OR 4 +2 = 6 (cm)* *(Perimeter = 2 × 8 + 2 × 6 or equivalent =) 28 (cm)*	 *M1 A1* *M1 A1* *B1*	 *FT 2 × 'their 8' + 2 × 'their 6', provided at least one M1 previously awarded*

			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.

4

			FT until 2nd error.
11.(a)	$7+5x-10=3x+8$ or equivalent.	B1	Bracket must be expanded or correct division by 5 e.g $x-2=\frac{3x}{5}+\frac{1}{5}$ (but not $x-2=\frac{3x+1}{5}$)
	$2x=11$ OR $-11=-2x$	B1	Or equivalent Correctly simplifying the equation to a single x term and number term (e.g. $2x-11=0$).
	$x=\frac{11}{2}$ or $5{\cdot}5$ or equivalent.	B1	Mark final answer. Correct answer implies B1B1B1. Do not allow $-x=\frac{-11}{2}$ or $x=\frac{-11}{-2}$ 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 any decimal answer to be rounded or truncated to 1 or more decimal place. Allow B1B1B1 for a correct embedded answer BUT only B1B1B0 if contradicted by $x\neq\frac{11}{2}$ or equivalent. Note: $12x-24=3x+8$ B0 $9x=32$ B1 (FT) $x=\frac{32}{9}$ or $3{\cdot}5(55\ldots)$ or $3{\cdot}6$. B1 (FT) If no marks awarded, award SC1 for sight of one of the following: • $5x-10$ • $12x-24$.
11.(b)	$2f=13-h$ or $h-13=-2f$	B1	Or equivalent.
	$f=\frac{13-h}{2}$ or $\frac{h-13}{-2}=f$ or equivalent	B1	Or equivalent. Must not come from incorrect working. Mark final answer. FT only from $\pm 2f=\pm 13\pm h$. Unsupported $f=\frac{\pm 13\pm h}{\pm 2}$ implies B0B1 unless B2. Award B1B0 for $-f=\frac{h-13}{2}$ or equivalent. **If no marks**, award SC1 for a final answer of either: • $f=(13-h)\div 2$ with or without brackets • $f=(h-13)\div -2$ with or without brackets • $\frac{13-h}{2}$ ('$f=$' missing). • $\frac{h-13}{-2}$ ('$f=$' missing).
11.(c)	$5(3x-7y)$	B1	Mark final answer. Allow $-5(-3x+7y)$ or $5(3x+-7y)$.

20.(a) (*AOY* =) 36(°)	B1	Check diagram.
(% shaded =) $\frac{36}{360}$ (× 100) or equivalent	M1	FT 'their derived or stated angle *AOY*' provided not 54°. Award M0A0 for $\frac{360(°)}{36(°)} = 10$, but award M1A1 if a final answer of 10% is seen.
= 10(%)	A1	If no marks awarded, award: • SC2 for unsupported 10% (*AOY* not shown or stated to be 36(°)) • SC1 for a final answer of 15% (from using 54(°)).
20.(b) Statement explaining that, 'The **tangent** at any point on a circle is **perpendicular** (or equivalent) to the **radius** at that point'.	E1	Accept unambiguous similar wording. e.g. 'Radius and tangent 90(°)'. Diameter could be used in place of radius. Must refer to tangent and radius by name (not simply *AY* and *OA* or description).

7.(a)(i) (p =) 12	B1	Allow B1 for a correct embedded answer BUT B0 if contradicted by $p \neq 12$.
7.(a)(ii) (n =) 14	B1	Allow B1 for a correct embedded answer BUT B0 if contradicted by $n \neq 14$.
7.(b) 2480 (cm)	B1	

(=) 1631 (seconds)	A1	
8.(a) 7000	B2	B1 for sight of 7200.
8.(b) 0·04 × (£)250 or equivalent (£) 10 ISW	M1 A1	
8.(c) 14 × 5 or equivalent (= 70) 70 ÷ 2 or equivalent = 35	M1 m1 A1	 FT 'their 14 × 5' ÷ 2 CAO
8.(c) Alternative method 1 *1/5 = 20% AND 10% = 7* *7 × 5* *= 35*	*B1* *M1* *A1*	 *FT 'their 7' provided 1/5 has been considered along with 50(%)* *CAO*
8(c) Alternative method 2 *14 × 2·5* = 35	*M2* A1	*May be seen in stages.* *e.g. 14 + 14 + 0·5 × 14* CAO

10. (a)	3·5 pints	B1	
10.(b)	20 miles	B1	

12.(a) 110(°)	B1	Award B1 for an answer in the range 108(°) to 112(°).
12.(b) 335(°)	B1	Award B1 for an answer in the range 333(°) to 337(°).

15. Identifying or implying that there are 16 possible correct combinations (e.g 2 × 6) or products (e.g.12)	B1	Award B1 for • simply stating 16 • (4 × 4 =)16 • **completed** sample space (need not be correct) • sight of $\frac{1}{4}\times\frac{1}{4}$ • sight of 16 in a denominator.
Identifies <u>all</u> possible combinations (e.g 2 × 6) or products (e.g 12) that are a factor of 36 *1 × 6 = 6, 1 × 9 = 9, 2 × 6 = 12* *2 × 9 = 18, 3 × 6 = 18, 4 × 9 = 36*	B2	FT 'their 16 possible correct products'. If products not used (e.g 2 + 6 = 8), do not award B2 or B1. Award B2 for **clearly identifying** one of the following: • the **6** (and no more) combinations 1 × 6, 2 × 9, etc that form factors of 36 that can be achieved by the two spinners • the **6** (and no more) products of factors of 36 that can be achieved by the two spinners: 6, 9, 12, **18, 18**, 36 • sight of $6\times\frac{1}{4}\times\frac{1}{4}$ or equivalent. Award B1 for **clearly identifying** one of the following: • at least 4 combinations that are factors of 36 • at least 4 products of factors of 36 that can be achieved by the two spinners: 6, 9, 12, 18, 36 • all of the factors of 36 (1,2,3,4,6,9,12,18,36).
(Probability factor of 36 =) $\frac{6}{16}$ or equivalent. ISW	B1	FT 'their list' only if at least 12 combinations or products given with **at least two factors of 36** that can be achieved by the two spinners **clearly identified.** Penalise, −1, any incorrect notation e.g. '6 out of 16'. Unsupported $\frac{6}{16}$ or $\frac{3}{8}$ or equivalent gains B1 B2 B1.

Unit 1: Intermediate Tier	Mark	Comments
5.(a) A correct explanation given. e.g. '(equal) groups do not reach 20', '12 to 15 and 16 to 19 so no 20', ' to reach 20 the groups are not equal' 'it only goes up to 19' '20 not included'.	E1	Allow any unambiguous explanation. Do not accept: 'because there's only 20 attempts'. Award E1 if incorrect values are given in the table but correct explanation given.
5.(b) (0 to 6) 7 to **13** **14** to 20	B1	Answer in table takes precedence.
5.(c)(i) $\frac{17}{100}$ or equivalent ISW	B1	B0 for incorrect notation e.g. '17 in 100', '17 out of 100', '17:100' etc.
5.(c)(ii) A correct explanation given e.g. 'the eleven competitors might have all scored 20', 'only one of them (might have) scored 19', 'we don't know how many competitors scored 19' 'the probability of scoring 18, 19 or 20 is $\frac{11}{100}$' 'the 11 could include (the scores of) 18 and 20' 'it doesn't tell you the exact score of all 11 competitors'	E1	Allow any unambiguous explanation. E0 for mixing number of competitors and number of points scored. e.g. '11 points were scored for 18, 19, 20' '18, 19 or 20 people could have scored 11'.

7.(a) $3k$	B1	Mark final answer
7.(b)(i) (x =) 45	B1	Accept embedded solutions unless contradicted by later working. Mark final answer
7.(b)(ii) (y =) 11	B1	Accept embedded solutions unless contradicted by later working. Accept x instead of y. Mark final answer
7.(b)(iii) (w =) 9	B1	Accept embedded solutions unless contradicted by later working. Accept x instead of w. Mark final answer

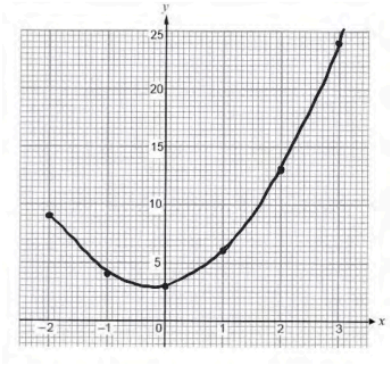
3.(a)	$3g-5f$ or $-5f+3g$	B2	Mark final answer. Must be in an expression for B2. Award B1 for one of the following: • sight of $(+)3g$ • sight of $-5f$ (do not allow …$-\,-5f$) • $3g+-5f$.

3.(b)	$5 \times 3 + 4R = 23$ or equivalent	M1	
	$4R = 8$ or equivalent	A1	Implies M1. (23 – 15 =) 8 or equivalent implies M1 but not M1A1. (23 – 15 =) 8 then 8 ÷ 4 or equivalent implies M1A1.
	$(R =) 2$	A1	FT only from $4R = k$. Mark final answer. Unsupported answer of 2 is awarded M1A1A1. $R = \frac{8}{4}$ is awarded M1A1A0. Allow M1A1A1 for a correct embedded answer BUT only M1A1A0 if contradicted by $R \neq 2$. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. <u>If no marks, award SC1 for one of the following:</u> • unsupported $R = 9{\cdot}5$ (from $4R = 23 + 15$) • sight of 107 (from 15 + 92).
3.(c)	Line D	B1	

6.(a)(i) $3y = 24$ 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 $y \neq 8$.
6.(a)(ii) $14t + 21 = 56$ OR $2t + 3 = 8$ $14t = 35$ OR $2t = 5$ $t = \frac{35}{14}$ OR $t = 2{\cdot}5$	B1 B1 B1	FT until 2nd error. Accept any value equivalent to 2·5. 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 correct answer is awarded B1 B1 B1. Allow an embedded answer but penalise -1 if contradicted by $t \neq 2{\cdot}5$ or equivalent.
6.(a)(iii) $8p - 3p = -25 - 5$ 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.

6.(b)	$w(w-6)$	B1	Allow • $w \times (w-6)$ • $w(-6+w)$ • $w \times (-6+w)$.

8.(a) (x =) 9	B1	Accept embedded answers. e.g. 7 x 9 (= 63) Mark final answer
8.(b) (x =) 8	B1	Accept embedded answers. e.g. 27 - 8 (= 19) Mark final answer
8.(c) 14k	B1	Allow k14

11.(a)	9 13	B2	Answers in table take precedence. B1 for each.
11.(b)	At least 4 correct plots and no incorrect plot.	P1	FT 'their (–2,9)' and 'their (2,13)' OR (–2,9) and (2,13) plotted (even when not shown in the table or contradicted). Allow ± '½ a small square'.
	A smooth curve drawn through their plots.	C1	FT 'their 6 plots' OR a curve through the 4 given points **AND** (–2,9) and (2,13). Clear intention to draw a curve through 'their plotted points'(± 1 small square horizontally or vertically). 

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).