REVISE
.wales

F2.02 — Primes, factors, multiples, LCM & HCF

Mark schemes for the F2.02 question pack

Spec 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.2.6 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 57 questions in the corresponding revise.wales question pack (127 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

3.(b)	Equilateral triangle	B1	
4.	5, 9, 10	B3	Answers in the spaces provided take precedence. B2 for meeting 3 of the 4 conditions: • the three numbers are different • one number is a square number • the other two numbers are factors of 20 • the sum of the three numbers is 24 B1 for meeting 2 conditions OR for listing either three different square numbers or three different factors of 20

			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'

				Correct answer of 1/3 gains B1 regardless.
18.(a)	$x(x^2 - 5)$		B1	
18.(b)	$2x^2 + 5x - 12$		B2	B1 for $2x^2 + kx - 12$ OR $2x^2 + 5x + k$
18.(c)	$(x - 7)(x + 4)$ ISW		B2	B1 for $(x \quad 7)(x \quad 4)$

9. (BÂP =) 72° (AP =) 6·8 (cm)	B1 B1	± 2° ± 2 mm

12.(a)	48°	B1	
12.(b)	East	B1	

			equivalent correct value but not in standard form.
15.	3x(4x + y)	B2	Accept 3x(4x + 1y) B1 for 3x(4x ± ….) or 3x(…..+ y) B1 for $3(4x^2 + xy)$ or $x(12x + 3y)$

		even if no previous marks gained.
18. $\angle$ BXC = 80(°) Reason: 'BX = BC' OR 'Isosceles triangle' $\angle$AXB (= 180 – 80) = 100(°) Reason: 'Angles on a straight line'. $\angle$ABX (= 180 – 40 – 100) = 40(°) Reason: 'Angles in a triangle'. Statement 'So AX = BX', Reason: 'Two equal angles (in a triangle)' OR $\angle$ ABX = $\angle$BAX OR 'Isosceles triangle'. Sight of at least TWO of the above reasons.	B1 B1 B1 B1 E1	*Angles shown on the diagram take precedence.* If any angle is not named then it must be unambiguously identified either on the diagram, from a given reason or in further work. (e.g. must be convincing that X = 80 is referring to BXC and not AXB.) If initial incorrect assumptions are made then allow correct FT methods to calculate other relevant angles. FT 180 – 'their $\angle$BXC' FT 180 – 40 – 'their $\angle$AXB'. Only available if $\angle$ABX **stated or shown** to be 40(°) Reasons must be appropriate AND are dependent on associated B1 gained.

3.(a) Sum of numbers (225) Sum of numbers / 9 25	M1 m1 A1	Allow for an unsupported value between 192 and 258 inclusive. Award this m1 for 'their sum' ÷ 9 CAO
3.(b) Correct explanation e.g. Neil hasn't written the numbers in (ascending or descending) order.	E1	

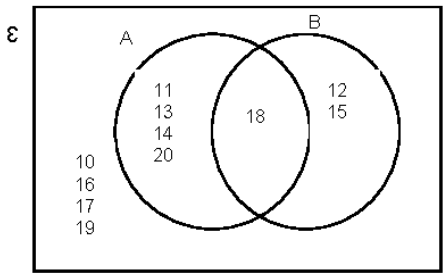
5.(a) Lines Curve	L1 C1	For all 3 straight lines. F.T. their lines, must have opposite curvature, starting at the correct place and ending at the start of their line.
5.(b) Rectangle	B1	
5.(c) Cylinder	B1	

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

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.

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	*Allow intent of drawing circles and a rectangle.* Two intersecting circles AND labelled A and B AND within a rectangle. Allow missing 'Ɛ' 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)'

5. (18% of £256 =) $0{\cdot}18 \times 256$ $= (£)46.08$	M1 A1	Allow (£)46.10
(Larger share =) $\frac{2 \times 46{\cdot}08}{3}$ $= (£)30.72$	M1 A1	FT 'their stated 18%'. If M0 allow SC1 for sight of (£)15.36
(To the nearest 10p =) (£)30.7(0)	B1	FT 'their larger share' (not 'their 18%') and only if rounding required.
5. Alternative method 1 *(Larger share of £256 =)* $\frac{2 \times 256}{3}$ $=(£)170.66(..)$	*M1* *A1*	*Allow (£)170.70* *If M0 allow SC1 for sight of (£)85.33.*
(18% of £170.66 =) 0·18 × 170.66 *= (£)30.72*	*M1* *A1*	*FT 'their stated larger share'.*
(To the nearest 10p =) (£)30.7(0)	*B1*	*FT 'their 18%' (not 'their larger share') and only if rounding required.*
5. Alternative method 2 *(Larger share of 18% =)* $\frac{2 \times 18}{3}$ *= 12(%)*	*M1* *A1*	*If M0 allow SC1 for sight of 6(%).*
(12% of £256 =) 0·12 × 256 *= (£)30.72*	*M1* *A1*	*FT 'their derived larger %'.*
(To the nearest 10p =) (£)30.7(0)	*B1*	*FT 'their amount' only if rounding required.*
5.OCW Organisation and Communication.	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means
Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc

8. (Area of the triangle CDE =) $14 = \frac{4 \times CE}{2}$	M1	*Lengths may be shown on the diagram.* Accept equivalent e.g. $28 = 4 \times CE$.
(CE =) 7 (cm)	A1	
(Area ABCE = 7 × 7 =) 49 (cm^2)	B1	FT 'their stated or shown length CE'.
(Area of whole shape = 49 + 14 =) 63 (cm^2)	B1	FT 'their stated or shown area of square' + 14.
8. *Alternative method* *(Area of the triangle CDE =)* $14 = \frac{4 \times CE}{2}$	*M1*	*Lengths may be shown on the diagram.*
(CE =) 7 (cm)	*A1*	
(Area Trapezium ABCD =) $\frac{[(7 + 4) + 7] \times 7}{2}$	*M1*	*FT 'their stated or shown length CE (=CB)' consistently as 'their 7'.*
= 63 (cm^2)	*A1*	
8.OCW Organisation and Communication.	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means
Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
9. (a =) $\frac{180 - 110}{2}$ or equivalent.	M1	
= 35(°)	A1	
b (= 180 – 90 – 35) = 55(°)	B1	OR FT 90 − 'their a'.
c (= 90 + 55) 145(°) OR c (= 180 − 35) 145(°)	B1	OR FT 90 + 'their b'. OR FT 180 − 'their a'

15. (Area of the triangle CDE =) $14 = \frac{4 \times CE}{2}$	M1	*Lengths may be shown on the diagram.* Accept equivalent e.g. $28 = 4 \times CE$.
(CE =) 7 (cm)	A1	
(Area ABCE = 7 × 7 =) 49 (cm^2)	B1	FT 'their stated or shown length CE'.
(Area of whole shape = 49 + 14 =) 63 (cm^2)	B1	FT 'their stated or shown area of square' + 14.
15. *Alternative method* *(Area of the triangle CDE =)* $14 = \frac{4 \times CE}{2}$	*M1*	*Lengths may be shown on the diagram.*
(CE =) 7 (cm)	*A1*	
(Area Trapezium ABCD =) $\frac{[(7 + 4) + 7] \times 7}{2}$	*M1*	*FT 'their stated or shown length CE (=CB)' consistently as 'their 7'.*
= 63 (cm^2)	*A1*	
16. (a =) $\frac{180 - 110}{2}$ or equivalent.	M1	
= 35(°)	A1	
b (= 180 – 90 – 35) = 55(°)	B1	OR FT 90 − 'their a'.
c (= 90 + 55) 145(°) OR c (= 180 − 35) 145(°)	B1	OR FT 90 + 'their b'. OR FT 180 − 'their a'

WJEC GCSE MATHEMATICS

AUTUMN 2019 MARK SCHEME

GCSE MATHEMATICS Unit 2: Foundation Tier		Mark	Comments
1.	72 150 52 59 168 158	B1 B1 B1 B1	
2.(a)	(44), 88, 132, 176, 220	B1	Ignore any additional multiples
2.(b)	33	B1	
3.	> < > <	B2	For all four correct. B1 for any three correct.
4.	(Perimeter of triangle = 14 + 14 + 14) = 42 (cm) (Length of side of square =) 42 ÷ 4 = 10.5 (cm)	 B1 M1 A1	 May be implied. F.T. 'their 42' provided ≠ 14
OCW	Organisation and Communication.	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means.
	Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
5.	0.1(0) 10% $\frac{2}{25}$ 0.08	B4	B1 for each correct response.
6.(a)	32.16	B1	Accept $32\frac{4}{25}$ and $\frac{804}{25}$. B0 for 804 ÷ 25.
6.(b)	0.4	B1	Accept $\frac{2}{5}$. B0 for 2 ÷ 5 or $\frac{1.6}{4}$
7.(a)	trapezium	B1	
7.(b)	cuboid	B1	
7.(c)	a reflex angle	B1	
7.(d)	parallelogram	B1	
8.(a)	Point R plotted correctly	B1	
8.(b)	(-3, 2)	B1	
9.	275	B2	B1 for sight of 301.

6.(a) 3 opposite 9 AND 5 opposite 7	B1	
6.(b) 4, 8, 28 Or 4,12, 24 Or 4,16, 20 Or 8,12, 20	B2	The values in the boxes take precedence. The numbers can be written in any order. B1 for any three multiples of 4 which are all different but do not add up to 40 (e.g. 4, 12, 20) OR which are not all different but do add up to 40 (e.g. 8, 16, 16). If boxes empty, then give credit as above for unambiguous answers in working space.

			Full (–) Som OR (scale –) 1 : 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	

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.

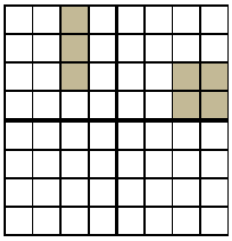
WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

	GCSE MATHEMATICS **Unit 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

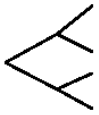
WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 2 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(ℰ)] must be 30 (i.e. no additional 'non-Spanish'). Any blank space to be taken as 0.
9. (Length of AD or BC =) 10 (cm) (Area of ABCD = 5 × 10 =) 50 (cm^2) (Area APB =) $\frac{\pi\times 5^2}{4}$ = 19·6(.....)(cm^2) (Shaded area = 50 − 19·6 =) 30·3(...) or 30·4(cm^2)	B1 B1 M1 A1 B1	May be seen on the diagram or implied in later work. FT 5 × 'their AD (or BC)'. The 50(cm^2) may be shown as two areas of 25(cm^2) for B1 B1. SC1 for sight of $\pi\times 5^2$ or equivalent (78·5....) FT 'their stated area ABCD' – 'their stated area APB' *Note: Sight of (25 – 'area of APB') + 25 implies the first two B marks. [rectangle divided in half]*
9. OCW Organisation and Communication. Accuracy of writing.	OC1 W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc

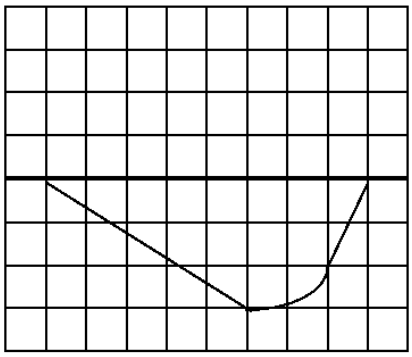
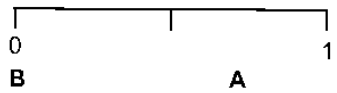
9. (Length of sides of Ivy's Cuboid B =) 3cm, 12cm, 20cm (Volume of Ivy's Cuboid =) 3 x 12 x 20 = 720 (cm^3)	B1 M1 A1	May be implied in further working. F.T. provided two of the dimensions are correct.
Alternative method *(Volume of Gareth's cuboid = 3 x 2 x 4 =) 24 (cm^3)* *(Volume of Ivy's cuboid =)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

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' $\times 4$ + $\frac{12 \times 4}{2}$ 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(cm^2) 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	

16. $2{\cdot}656 \times 10^6$	B2	B1 for a correct value but not in standard form. Mark final answer. B1 for sight of 2 656 000. SC1 for $2{\cdot}66 \times 10^6$ or $2{\cdot}7 \times 10^6$ or $2{\cdot}6 \times 10^6$ or $2{\cdot}65 \times 10^6$
17. Sight of 24·5 AND 15·5 OR Sight of 23·5 AND 14·5	B1	Sight of (Greatest =) 80 OR (Least =) 76 implies B1
2(24·5 + 15·5) – 2(23·5 + 14·5) or equivalent	M1	FT only for upper bounds of 24·4 AND 15·4 or 24·49 AND 15·49 (lower bounds must be 23·5 AND 14·5 else M0)
= 4(cm)	A1	CAO If M0, award B1 and an SC1 for sight of (Greatest =) 80 AND (Least =) 76
Alternative method. *Difference between least and greatest length for each side = 1(cm)*	*B1*	
4 × 1	*M1*	*FT only for differences of 0·9 or 0·99*
= 4(cm)	*A1*	*CAO*
18. Method to eliminate variable e.g. equal coefficients with appropriate addition or subtraction. First variable found, x = 4 or y = −1. Substitute to find the 2nd variable. Second variable found	 M1 A1 m1 A1	*No marks for trial and improvement.* Allow 1 error in one term, not the term with equal coefficients. C.A.O. F.T. their '1st variable'. Award no marks for unsupported correct answers.
19.(a)(i) Correct reason given. e.g. 'An angle at the circumference subtended by a diameter is a right angle'. ' line AC is a diameter'	E1	Accept any correct unambiguous wording. The key word is 'diameter'. Allow eg 'angle in a semicircle is 90°', 'line AC goes through the centre'. 'opposite a diameter' Do not accept 'because it's a right angle'.
19.(a)(ii) $\tan x = \frac{7{\cdot}5}{4{\cdot}7}$	M1	
$x = \tan^{-1}(7{\cdot}5 / 4{\cdot}7)$ or $\tan^{-1} 1.6$ or $\tan^{-1} 1.59(\ldots)$	m1	Implies M1.
= 57·9(…)(°) or 57·8(…)(°) or 58(°)	A1	C.A.O. *Alternative method to find x* *A correct and complete method (using Pythagoras's theorem and a trigonometric relationship).* *M2* *x = 57·9(…)(°) or 57·8(…)(°) or 58(°) CAO* *A1*
19.(b) (y =) 58(°)	B1	Strict FT of 'their x'.
Correct circle theorem given. e.g. 'angles (at the circumference) subtended by the same chord (or arc) are equal', 'angles in the same segment (are equal)'.	E1	Accept any correct unambiguous wording. Allow eg 'angles on the same chord (are equal)' Do not accept e.g. 'they are equal' on its own.

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: Intermediate Tier		Mark	Comments
1.(a)	$7x = 14$ $x = 2$	B1 B1	 FT from $7x = k$. Accept $x = k/7$ (but, if on FT k is a multiple of 7, final answer must be given as a whole number.) B1B0 for 'x = 14/7' An evaluated FT for $k \div 7$ must be rounded or truncated to at least 2dp. e.g. $7x = 8$ (B0) followed by, $x = 8 \div 7$ (B0) $x = 8/7$ (B1), $x = 1\frac{1}{7}$ (B1), x = 1·14 (B1), x = 1·1 (B0) Mark final answer. Allow 2 marks for embedded answer BUT only 1 mark if contradicted by $x \neq 2$.
1.(b)	10	B2	C.A.O. B1 for sight of 17·4 OR −7·4 Do not accept 17·4f nor −7·4g Do not treat the use of 3·7 for −3·7 as a misread.
2.(a)	$\frac{24}{54}$	B1	
2.(b)	23	B1	
2.(c)	1853	B1	
3.	(Total number of paper clips =) $200 \times 440 \times n$ where $320 \leq n \leq 330$.	M2	M1 for $200 \times n$ OR $440 \times n$ where $320 \leq n \leq 330$. Allow use of 400 or 450 for 440. *Note* *If n taken to be 225 or 425 treat as a misread and allow M2 but penalise −1 from any further A1, B1 marks gained.*
	Correct evaluation.	A1	CAO from their numbers if M2 gained. (n=320 gives 28 160 000, n=325 gives 28 600 000, n=330 gives 29 040 000.)
	(To the nearest ten million) 30 000 000 (paper clips)	B1	FT 'their evaluation' if greater than 5 million. A final answer of 30 million implies M2A1B1. Allow M2A0B0 for an unsupported final answer of 28 000 000 or 29 000 000.
OCW	Organisation and Communication.	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means
	Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
4.(a)	3	B1	If no answer seen, check table.
4.(b)	15	B1	If no answer seen, check table.

11.(a) 360	B2	Mark final answer. B1 for $2^3 \times 3^2 \times 5$. OR B1 for any other common multiple e.g. 720, 1080 etc. unambiguously identified as a final answer. OR B1 for sight of correct prime factors e.g. $60 = 2^2 \times 3 \times 5$ or equivalent. AND $72 = 2^3 \times 3^2$ or equivalent. OR Accurate Venn diagram showing correct prime factors. OR B1 for sight of 60, 120, 180, 240, 300, 360, ... AND 72, 144, 216, 288, 360 with no further numbers
11.(b) For a single method that produces 2 prime factors from the set {2, 3, 3, 7, 7} before the 2nd error.	M1	Must be a method of 'repeated division'.
2, 3, 3, 7, 7	A1	C.A.O. For sight of the five correct factors (Ignore 1s)
$2 \times 3^2 \times 7^2$	B1	F.T. 'their primes' provided at least one index form used with at least a square. Do not F.T. non-primes. Allow $(2)(3^2)(7^2)$ and $2.3^2.7^2$ Do not allow $2,3^2,7^2$. Inclusion of 1 as a factor gets B0.
12. 6 −2	B2	B1 for each.
At least 5 correct plots and no incorrect plot.	P1	F.T. 'their (−1,6)' AND 'their (3,−2). Allow ±'½ a small square'.
A smooth curve drawn through their plots.	C1	F.T. 'their 7 plots' OR a curve through the 5 given plots AND (−1,6) AND (3,−2). Allow for the intention to pass through their plots. (within 1 small square, either horizontally **or** vertically of the point).
13. (Curved length =) 3·14 × 4 or equivalent = 12·56 (cm)	M1 A1	Do not allow M1 if subsequently divided by 2. Allow 4π for M1A1 Allow SC1 for an answer of 25·12 (whole circle). (If 12·56 shown, but then doubled, only award the SC1)
(Perimeter =) 20·56 (cm)	B1	FT 'their derived 12·56' + 8. (Even 'an area' + 8) Allow $4\pi + 8$.

2.	Showing 30% (31%), and 32% OR 30/100 , 31/100 and 32/100 OR (0·3), 0·31 and 0·32 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 or two correct calculations for a common amount.
	0·3 31%, 8/25 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 final B1 only.

3.(b) Sphere	B1	
4.(a) 48, 96, 144, 192	B1	Condone inclusion of 240 if 48 is omitted.
4.(b) 3	B1	

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).

14. 360 – 90 – 220 or equivalent = 50(°) (x =) (180 - 50) ÷ 2 or equivalent = 65(°)	M1 A1 M1 A1	*Answer line takes precedence.* Note: 360 – 310 or 270 – 220 or 140 – 90 Award M1 for complete method or intention of complete method provided not contradicted e.g. brackets missing 360 - 90 + 220 May be seen in later working May be seen in stages FT (180 – 'their 50') ÷ 2
14. <u>Alternative method</u> *(Exterior angle = sum of the two opposite interior angles =) 220 – 90(=) 130(°)* *(x =) 130 ÷ 2 or equivalent* = 65(°)	*B1* *M2* *A1*	*Answer line takes precedence.* *FT (their '220 – 90') ÷ 2*

Unit 2: Foundation Tier		Mark	Comments
1.(a) 452 × 63 = 28 466		B1	
1.(b)	3838	B1	
1.(c) 22		B1	

3. (a) 33	B1	Answer line takes precedence.
3. (b) 37	B1	Answer line takes precedence. Award B1 for sight of 3 and 37.

3. 29 16 35	B4	Answer box takes precedence If B4 not awarded: Award B1 for 29 selected Award B1 for 16 selected Award B2 for 35 selected or award B1 for 21 selected (if both 21 **and** 35 given, award B1) Penalise -1 if all the 3 two-digit numbers are correct but not in the correct order. Allow unambiguous answers for each statement written in each box (ie using 12 digits)

5. (a)	0·034	B1	
5. (b)	67 000	B1	
5. (c)	$3(4e+5)$	B1	

6.	30	B2	Answer line takes precedence. If answer line is left blank allow unambiguous indication of the answer. Award B1 for one of the following as a final answer: 6, 15, 18, 21, 22, 24, 26, 33, 34, 42, 66, 78… (satisfies 2 conditions)

12. *(a)* 33	B1	Answer line takes precedence
12. *(b)* 37	B1	Answer line takes precedence Award B1 for sight of 3 and 37.

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)

14.	30	B2	Answer line takes precedence. If answer line is left blank allow unambiguous indication of the answer. Award B1 for one of the following as a final answer: 6, 15, 18, 21, 22, 24, 26, 33, 34, 42, 66, 78… (satisfies 2 conditions)

2.(a)	$\frac{1}{6}$	B1	
2.(b)	31 43 47	B2	Answer space takes precedence. Award B2 for all three primes. Accept in any order. Award B1 for two correct primes. If no answers given on answer spaces, and numbers given are circled/clearly indicated, award B1 for one of the following: • two correct primes provided no more than 3 numbers selected • all 3 primes and 1 incorrect number if 4 numbers selected.
2.(c)	$(n =)$ 4	B1	Note: Award B1 for a correct embedded answer e.g. $3^4 = 81$, BUT B0 if contradicted by $n \neq 4$.

			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 $5(3x+-7y)$.

12.(a)	$\frac{1}{6}$	B1	

	31	43	47	B2	Award B2 for all three primes. Accept in any order. Award B1 for two correct primes. If no answers given on answer spaces, and numbers given are circled/clearly indicated, award B1 for one of the following: • two correct primes provided no more than 3 numbers selected • all 3 primes and 1 incorrect number if 4 numbers selected.

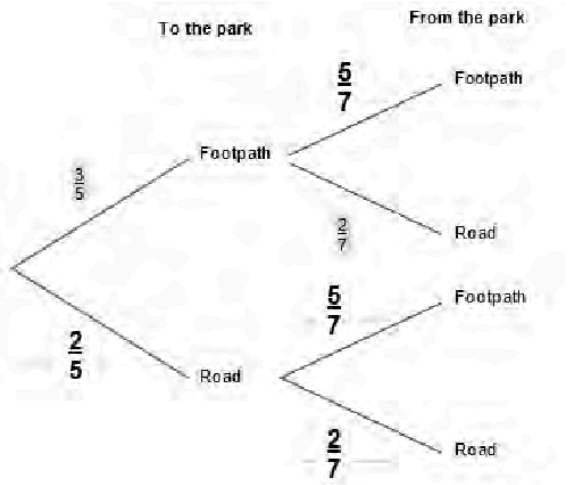
12.(a) P(Bronze) = 0·2 **AND** P (No Prize) = 0·6 or equivalent	B2	The values in the table takes precedence. Award B1 for one of the following: • P(Bronze) = 0·2 (must be clearly identified) • P(No Prize) = 0·6 • P(Bronze) + P(No Prize) = 0·8 • P(Bronze) = ⅓ P(No Prize) provided both <1.
12.(b) 15 ÷ 0·02 × 0·18 or 15 × 9 or equivalent = 135	M1 A1	Must be for a complete method e.g. • 15 ÷ 2 = 7·5 7·5 × 18 = 135 • 750 – (450 + 150 + 15) • 0·02 : 0·18 15 : 135 (e.g 0·18 × 750, or 15 × 9) Award M1 A1 for a final answer of 15 : 135. Sight of 135 as a numerator in a fraction < 1 implies M1A0.

4. 9·2	B2	Answer line takes precedence. Award B2 for all three clues satisfied. Award B1 for one of the following on the answer line: • 6·9 • 11·5 • 84·64 • $9{\cdot}2^2$ Award B2 if answer line is blank but a **final** answer of 9·2 is clearly embedded (e.g. $9{\cdot}2^2$) in the working space. Award B1 if a final answer of 9·2 is contradicted on the answer line (e.g. $9{\cdot}2^2 = 84{\cdot}64$ in working space, but 84·64 is written on the answer line).

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.*

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

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.

16. (a) Complete diagram 	B2	**If B2 not awarded**, award B1 for **one** of the following: • 2/5 or equivalent on Road to the park branch • 5/7 on a Footpath from the park branch.
16.(b) $\frac{3}{5} \times \frac{5}{7}$ or equivalent $\frac{15}{35}$ or equivalent ISW	M1 A1	FT $\frac{3}{5}$ × 'their $\frac{5}{7}$' (on 'uppermost footpath home branch') provided less than 1.

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.

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'.

Unit 2: Intermediate Tier	Mark	Comments
17. $(x+8)(x-5)$	B2	Award B1 for one of the following: • $(x \ldots 8)(x \ldots 5)$ • two brackets which multiply to give x^2+3x+k • two brackets which multiply to give $x^2+mx-40$.
$(x=)\ -8$ AND $(x=)\ 5$	B1	**Strict FT** from their brackets. If no factorising shown, allow the following. B2 for $x+8\ (=0)$ AND $x-5\ (=0)$ (B1) $(x=)\ -8$ AND $(x=)\ 5$ (B1) OR B1 for $x-8\ (=0)$ AND $x+5\ (=0)$ (B0) $(x=)\ 8$ AND $(x=)\ -5$ (B1) FT OR B1 if only $(x=)\ -8$ AND $(x=)\ 5$ seen (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 • $w \times (w-6)$ • $w(-6+w)$ • $w \times (-6+w)$.

10. For a correct method that produces 2 prime factors from the set {3,3,3,5,7} before 2nd error.	M1	Must be a method that involves only division. Check for errors in the method before checking the 2 prime factors from the set.
3, 3, 3, 5 , 7	A1	CAO. For sight of the five correct factors (ignore 1s) with no other terms (if tree method used, use end of branches).
$3^3 \times 5 \times 7$	B1	FT 'their primes' provided at least one index form used with at least a square. Do not FT non-primes. Allow $(3^3)(5)(7)$ or $3^3.5.7$ Do not allow 3^3,5,7. Inclusion of 1 as a factor gets B0.

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.

16.(a) Sight of $x^2 + 8x + 15 = 120$ (leading to $x^2 + 8x - 105 = 0$)	B2	Must be convincing. Award B1 for one of following: • $(x + 5)(x + 3) = 120$ • $x^2 + 5x + 3x + 15$ • $x^2 + 8x + 15$ • $x^2 + kx + 15 = 120$ $(k \neq 0)$ • $x^2 + 8x + k = 120$ $(k \neq 0$ or $-105)$.
16.(b) $(x + 15)(x - 7)$ $(x =) -15$ AND $(x =) 7$	 B2 B1	May be seen in part (a) or (c), provided not contradicted in (b). Award B1 for one of the following: • $(x \ldots 15)(x \ldots 7)$ • two brackets which multiply to give $x^2 + 8x + k$ but not $(x + 5)(x + 3)$ • two brackets which multiply to give $x^2 + kx - 105$. Mark final answer. **Strict FT** from their brackets, provided not from $(x + 5)(x + 3)$. If no factorising shown, allow the following: B2 for $x + 15\ (=0)$ AND $x - 7\ (=0)$ (B1) $(x =) -15$ AND $(x =) 7$ (B1) B1 for $x - 15\ (=0)$ AND $x + 7\ (=0)$ (B0) $(x =) 15$ AND $(x =) -7$ (B1) FT B1 if only $(x =) -15$ AND $(x =) 7$ seen. (B1)

16.(c)		Allow dimensions and/or justification to be seen in part (a) or (b), provided not contradicted in (c). Answer lines take precedence.
Length = 12 (cm), Width = 10 (cm)	B1	FT 'their 7' + 5 and 'their 7' + 3 provided • one x value from (b) > -3 **AND** one x value from (b) < -3 • both length and width are positive. If not on answer line, must clearly be length and width. Unsupported answers are awarded B1.
Statement about ignoring $x = -15$ **as it leads to negative lengths** or that x must be > -3.	E1	Allow "you can't have a negative length (on the rectangle)" "the width can't be negative" Do not accept incorrect or vague explanations e.g. "x can't be negative" "x must be positive" "it can't be negative".

End of solutions