REVISE
.wales

F1.10 — Rounding & decimal places in context

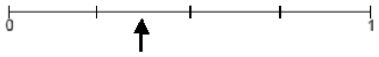
Mark schemes for the F1.10 question pack

Spec 1.1.4, 1.1.5, 1.1.7, 1.6.1, 1.6.2 — Unit 1

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 60 questions in the corresponding revise.wales question pack (155 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

5.(b)	Square	B1	Accept regular quadrilateral.
6.(a)	5530	B2	B1 for 5529(.411…..) OR B1 for 5520

		• use appropriate terminology, units, etc.
11.(a) 3	B1	
11.(b) unlikely	B1	
11.(c) 	B1	Any indication of ¼ to ½ exclusive.

11.(a)	25·1		B2	B1 for 25(·….).
11.(b)	−14·3		B2	B1 for 14·3 OR −14·2( )

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

1.(c)	17	B1	
2.(a)	10 miles	B1	
2.(b)	1 kg	B1	
2.(c)	7 pints	B1	

		B0 if not a whole number.
8. (EC = Side of the square =) $\frac{28}{4}$	M1	*Lengths may be seen on the diagram.*
$= 7(\text{cm})$	A1	Any side of square shown as 7(cm) is M1A1.
(Area of triangle CDE =) $\frac{7 \times DE}{2} = 35(\text{cm}^2)$	M1	FT 'their stated or shown length for EC'.
(DE =) 10(cm)	A1	
Organisation and Communication.	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical
Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.

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

	= 174	A1	
11.(a)	8·27	B2	Mark final answer. B1 for sight of 8·26(……) or for sight of 8·270 or for sight of 8·30 or for sight of 8·3
11.(b)	0·0213	B2	Mark final answer. B1 for sight of 0·0212(…….) Ignore 'recurring dot'.

5.(a) $\frac{60 \times 300}{2000} = 9$ OR $\frac{59 \times 300}{2000} = 8{\cdot}85$ or $8{\cdot}9$ or 9 OR $\frac{60 \times 301}{2000} = 9{\cdot}03$ or 9	M1 A1	Must be seen. M0 for exact calculation. Do not accept any other approximated values. Unsupported answer is M0A0.
5.(b)(i) 19·437	B1	
5.(b)(ii) 34·1	B1	Accept 34·10

17.(a) $\frac{60 \times 300}{2000} = 9$ OR $\frac{59 \times 300}{2000}$ = 8·85 or 8·9 or 9 OR $\frac{60 \times 301}{2000}$ = 9·03 or 9	M1 A1	Must be seen. M0 for exact calculation. Do not accept any other approximated values. Unsupported answer is M0A0.
17.(b)(i) 19·437	B1	
17.(b)(ii) 34·1	B1	Allow 34.10

18.(a) Tan x = $\frac{6{\cdot}4}{8{\cdot}2}$ (x =) $\tan^{-1}$ 0·78(0..) or $\tan^{-1}\frac{6{\cdot}4}{8{\cdot}2}$ = 38(°) OR 37·9(...°)	M1 A1 A1	 Implies previous A1.
Alternative method. ***Correct** use of 'two-step' method.* *(x) = 38(°)*	 M2 A1	 *A partial trigonometric method is M0.* *Accept an answer that rounds to 38(°)*
18.(b) (PAQ = 90 – 38 =) 52(°) AQ = $\frac{7{\cdot}9}{\sin 52(°)}$ (AQ) = 10(cm) OR 10·0(…cm)	B1 M2 A1	FT 90° − 'their 38°'. May be seen on the diagram. FT 'their clearly defined PAQ' BUT not if PAQ = 'their x'. M1 for sin52(°) = $\frac{7{\cdot}9}{AQ}$
Alternative method. PQA =*38(°)* AQ = $\frac{7{\cdot}9}{\cos 38(°)}$ (AQ) = 10(cm) OR 10·0(…cm)	 B1 M2 A1	 FT 'their 38°'. May be seen on the diagram. FT 'their clearly defined PQA' M1 for cos 38(°) = $\frac{7{\cdot}9}{AQ}$
Alternative method. *(PAQ = 90 – 38 =) 52(°)* ***Correct** use of 'two-step' method.* *(AQ) = 10(cm)*	 *B1* *M2* *A1*	 *FT 90° − 'their 38°'.* *A partial trigonometric method is M0.* *FT 'their clearly defined PAQ'* *BUT not if PAQ = 'their x'.* *Accept an answer that rounds to 10(cm)*

1.(b)	440	B1	B0 for 440·0
2.(a)	(19 − 18·2 =) 0·8	B2	B1 for sight of 19 OR sight of −18·2. BUT B0 for 19f − 18·2g. Mark final answer.
2.(b)	7x = 16 (x =) 16/7 (x=) 2·3 (to 1dp)	B1 B1 B1	 FT from 7x = k. Allow 16 ÷ 7 FT from any fraction that requires rounding. Mark final answer. (x =) 2·2.... implies B1B1B0. Allow an embedded 2·3 B1B1B0

5(a) 481·63	B1	Do not accept 481·630
5(b) 64	B1	
5(c) 7	B1	Do not accept 7x7 or 7x7=49 alone.
5(d) (0)·03825	B1	
Ribbon mark 6(a),(b),(c),(d) 6(a) Football	B1	
Ribbon mark 6(a),(b),(c),(d) 6(b) 1/4 or equivalent ISW	B1	Do not accept incorrect notation; e.g. 1 in 4,1 out of 4, 1:4.
Ribbon mark 6(a),(b),(c),(d) 6(c) 1/4 × 60 15	M1 A1	Accept 15 out of 60. Award SC1 only, for a final answer of 15/60
Ribbon mark 6(a),(b),(c),(d) 6(d) Correctly labelled axes. Uniform scale starting from zero. Correct equal width bars for football, swimming and tennis.	B1 B1 B1	Vertical axis labelled 'number (of people)' or '*people*' or 'frequency' AND horizontal axis marked with the sports. Correct heights for 'their scale' (30 and 15) FT their (c) if possible: 'their swimming' = 'their tennis' AND either 'their football' = 2 x 'their tennis' or 'their football' = 60 – 2 x 'their tennis'. If no scale visible, allow final B1 for bars drawn in correct proportions.
7.(Number across = 20÷4=) 5 OR (Number down = 6÷2 =) 3 (Total number of small rectangles =) 5 × 3 15	B1 M1 A1	Sight of 5 or 3, not in incorrect statement or working FT 'their stated across and down' CAO
7. *Alternative method* *(Area rectangle A=2×4=) 8 (cm^2) OR* *(Area rectangle B=6×20=) 120 (cm^2)* *(No. of rectangle A=) 120 ÷ 8* *15*	B1 M1 A1	Sight of 8 or 120, not in incorrect statement or working FT 'their stated areas' CAO
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

9. Length of sides in Cuboid B = 5 (cm), 3(cm), 6 (cm) Volume of Cuboid B = 5 x 3 x 6 = 90 (cm^3)	B1 M1 A1	Award B1 for (height =) 6 (cm), provided length and width aren't also multiplied by 3. F.T. 'their height' x 5 x 3
Alternative method *(Volume of Cuboid A =) 5 x 3 x 2* *= 30 (cm^3)* *(Volume of Cuboid B =) 90 (cm^3)*	*M1* *A1* *B1*	 *F.T. for their stated or derived volume for Cuboid A'*
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) Subtract six (from the previous term)	B1	Accept 'take away 6' or '(goes) down in 6s'. Allow -6. B0 for n-6
10.(a)(ii) Double (the previous term)	B1	Accept 'multiply by 2' or 'times by 2'. Allow ×2. B0 for n×2
10.(b)(i) x + 3	B1	Mark final answer.
10.(b)(ii) (£)15g	B1	Mark final answer. Accept 15 × g
11.(a) 28·34 or 1417/50 or $28^{17}/_{50}$ ISW	B2	B1 for sight of 23·04 OR sight of 5·3. If B0 allow SC1 for 28 or 28·3
11.(b) 34·8 or 174/5 or $34^{4}/_{5}$ ISW	B1	
12.(a) (19 − 18·2 =) 0·8	B2	B1 for sight of 19 OR sight of −18·2. BUT B0 for 19f − 18·2g. Mark final answer.
12.(b) 7x = 16 (x =) 16/7 (x=) 2·3 (to 1dp)	B1 B1 B1	 FT from 7x = k. Allow 16 ÷ 7 FT from any fraction that requires rounding. Mark final answer. (x =) 2·2…. implies B1B1B0. Allow an embedded 2·3, B1B1B0
13.(a) 4 hours 45 min	B1	
13.(b) 2·4 km	B1	
13.(c) 7km less than 5 miles — TRUE 1kg less than 2lb — FALSE 1 litre less than 1 pint — FALSE 8 litres less than 900cm^3 — FALSE	B2	For all 4 correct. B1 for 3 correct.

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.

= 7240	A1	
18. x = 54(°) Opposite angles (of a) cyclic quad. (add up to 180°).	B1 E1	Dependent on an attempt at 180 – 126.
y = 108(°) Angle at the centre (is twice the angle at the circumference).	B1 E1	FT 2 × 'their 54' only if less than 360° Dependent on an attempt at 2 × 'their 54'.

10.(a) 1, 4 and 25	B3	Answer space takes precedence. Accept 1^2, 2^2 and 5^2. B2 for writing three numbers which add to 30, two of which are square (e.g. 16, 9, 5). B1 for writing three numbers: • at least two of which are square, OR • which add to 30, one of which is square, OR • which are all square. SC2 for an answer of 1, 2 and 5 with correct working. SC1 for an unsupported answer of 1, 2 and 5
10.(b) 1, 5, 7, 7 OR 3, 5, 7, 7	B3	Answer space takes precedence. B2 for writing four odd and positive numbers (not 7, 7, 7, 7) which fulfil one of the conditions: • the mode of the numbers is 7 • the median of the numbers is 6 OR for an answer which satisfies both conditions but includes an even number (e.g. 2, 5, 7, 7) B1 for writing four numbers which fulfil only one of the conditions: • the mode of the numbers is 7 • the median of the numbers is 6 OR for an answer of 7, 7, 7, 7.
11.(a) 0·125 × 1176 or equivalent. = 147 ISW	M1 A1	
11.(b) 4·7	B2	If further incorrect work shown e.g. '4·7 = 5' then allow B1 only. B1 for sight of 4·6 or 4·68(…..) or 4·70
12. f = 73(°) g = 128 – 73 = 55(°)	B1 M1 A1	F.T. 128 − 'their f'.
Alternative method f = 73(°) *g = 180 – (180 −128) – 73* *= 55(°)*	*B1* *M1* *A1*	*FT 'their f'.*
13. (1) **5** (9) (7) (8) **2** **9** (4) (1)	B3	B1 for each. No F.T.
14.(a) $\frac{1}{12}$	B1	
14.(b) D	B1	
14.(c) $\frac{1}{3}$	B1	
15. Sight of 6·25 (hrs) OR 375 (min) (Planning =) $\frac{2}{5}$ × 6·25 OR $\frac{2}{5}$ × 375 = 2·5 (hrs) OR 150 (min) (Remainder of work = 6·25 − 2·5 OR 375 – 150 =) 3·75 (hrs) OR 225 (min) = 3 hours 45 minutes	B1 M1 A1 B1 B1	F.T. 'their time' in hours or in minutes. May be seen in parts (1/5th and then 2/5ths) [Note: 2/5 × 6·15 OR 2/5 × 615 is B0M1(FT) = 2·46(hrs) OR 246(min) A1(FT) BUT A0 if 2·46 then used as 2h 46m] F.T. 'their derived times' using same units. F.T. correct conversion of 'their times', correct to the nearest minute (rounded or truncated), if of equivalent difficulty. Allow unambiguous indication of units.

17.	8	B1	
18.	$\frac{24 \times AC}{2}$ = 84 or equivalent.	M1	
	AC = 7 (cm)	A1	
	$(BC^2 =)\ 7^2 + 24^2$	M1	F.T. 'their AC'.
	$BC^2 = 625$ or $(BC =)\ \sqrt{625}$	A1	Final answer of BC = 625 is M1A0A0.
	(BC =) 25(cm)	A1	F.T. $\sqrt{}$'their 625' provided M1 gained.
	(Perimeter = 24 + 7 + 25 =) 56(cm)	B1	F.T. 24 + 'their AC' + 'their BC' provided at least one M1 mark gained AND 'their BC' > 24.
			Alternative method to find BC *A correct and complete method (e.g.using two trigonometric relationships.)* *M2* *BC = 25(cm)* *A1*

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

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

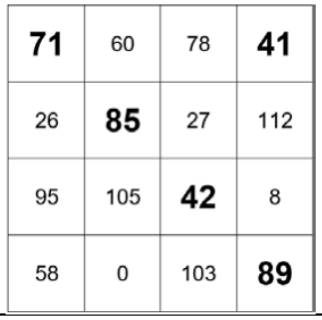
WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 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 2021 MARK SCHEME

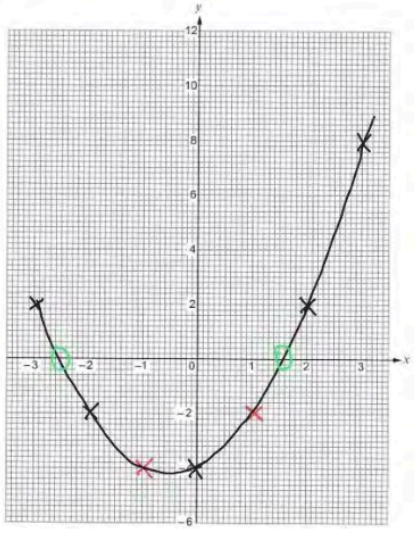
Unit 2: Foundation Tier	Mark	Comments
1.(a) 5169	B1	
1.(b) 6502	B1	
1.(c) 186	B1	
1.(d) 45	B1	
2.(a) 5, 5, 5, 5	B1	
2.(b) Exactly two 3s and any other two numbers	B1	Accept in any order.
2.(c) Exactly one 2 and any other three numbers	B1	Accept in any order.
3.(a) 40 065	B1	
3.(b) 5400	B1	
4.(a) rhombus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

5.(a) (0)7:45 23 (March)	B2	B1 for each. B0 for (0)7:45 p.m.
5.(b) Sight of 5 miles ≡ 8 km or equivalent. Shows 15 miles to be 24 km AND a valid statement e.g. 'yes (it's nearly 25 km'), 'no (it's only 24 km').	B1 B1	Allow a more accurate conversion (5 miles ≡ 8 to 8·05 km). Do not accept 3 miles ≡ 5 km '15 miles is 24 km' with no statement is B1B0. Accept a one word decision of 'Yes' or 'No' as a statement.
Alternative method *Sight of 8 km ≡ 5 miles or equivalent.* *Shows 25 km to be 15·625 miles AND a valid statement e.g.* *'yes (it's just over 15 miles'), 'no (it's over 15 miles)'.*	*B1* *B1*	*Allow a more accurate conversion* *(8 km ≡ 4·97 to 5 miles).* *Do not accept 5 km ≡ 3 miles* *'25 km is 15·625 miles' with no statement is B1B0.* *Accept a one word decision of 'Yes' or 'No' as a statement.*
6. Correct strategy of √(Area ABCD – 32) (Area ABCD =) 81 (cm^2) (Area PQRS = 81 – 32 =) 49 (cm^2) (PQ = √49 =) 7 (cm)	S1 B1 B1 B1	FT 'their stated area of ABCD' – 32. FT √'their stated area of PQRS' but not √32 or √9 A final answer of 7(cm) gains all four marks. May be seen on the diagram. (FT answers must be rounded or truncated to 1dp or more)
7.(a) 1·442	B2	B1 for sight of 1·44(1……) or 1·44(2……)
7.(b) 191	B3	B2 for sight of 190(·5…..) or 190·6 B1 for sight of 280.
8. (P(Gold) =) 1 – 0·68 – 0·22 = 0·1 22 people choose silver AND 10 people choose gold (Profit =) 100 × (£)2 – 22 × (£)3 – 10 × (£)8 = (£)54	M1 A1 B1 M1 A1	 May be seen in the table. FT 100 × 'their 0·1'. The 10 implies previous M1A1. The 22 and 10 may be seen in further work. FT 'their stated number of winners (silver and gold)'.
Alternative method1 *(P(Gold) =) 1 – 0·68 – 0·22* *= 0·1* *22 people choose silver AND 10 people choose gold* *(Profit =) 68 × (£)2 – 22 × (£)1 – 10 × (£)6* *= (£)54*	*M1* *A1* *B1* *M1* *A1*	 *May be seen in the table.* *FT 100 × 'their 0·1'. The 10 implies previous M1A1.* *The 22 and 10 may be seen in further work.* *FT 'their stated number of winners (silver and gold)'.*
Alternative method 2. *(P(Gold) =) 1 – 0·68 – 0·22* *= 0·1* *(Profit per game =)(£)2 – 0·22 × (£)3 – 0·1 × (£)8* *= (£)0·54* *(Total profit = £0·54 × 100 =) (£)54*	*M1* *A1* *M1* *A1* *B1*	 *May be seen in the table.* *FT 'their 0·1.* *FT 'their derived £0·54'.*
Alternative method 3. *(P(Gold) =) 1 – 0·68 – 0·22* *= 0·1* *(Profit per game =)0·68×(£)2 – 0·22×(£)1 – 0·1×(£)6* *= (£)0·54* *(Total profit = £0·54 × 100 =) (£)54*	*M1* *A1* *M1* *A1* *B1*	 *May be seen in the table.* *FT 'their 0·1.* *FT 'their derived £0·54'.*
9.(a) −1·3 0·4 2·1	B2	B1 for two correct in the correct position. OR for −3, −1·3, 0·4.
9.(b) 10(th term)	B1	Allow B1 for 10(th) and 14. B0 if only 14 given in answer space. NOTE: If answer to 9(a) is −3, −1·3, 0·4 then allow an answer of 11(th term)

10. (-2, 1)	B2	B1 for: • one correct coordinate, or • a clear indication of the correct position of the midpoint, or • the correct coordinates reversed.
11.(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), $x = 1^{1}/_{7}$ (B1), $x = 1{\cdot}14$ (B1), $x = 1{\cdot}1$ (B0) Mark final answer. Allow 2 marks for embedded answer BUT only 1 mark if contradicted by $x \neq 2$.
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
11.(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.
12. (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.
13.(a) 3	B1	If no answer seen, check table.
13.(b) 15	B1	If no answer seen, check table.
14.(a) (0)7:45 23 (March)	B2	B1 for each. B0 for (0)7:45 p.m.
14.(b) Sight of 5 miles ≡ 8 km or equivalent.	B1	Allow a more accurate conversion (5 miles ≡ 8 to 8·05 km). Do not accept 3 miles ≡ 5 km
Shows 15 miles to be 24 km AND a valid statement e.g. 'yes (it's nearly 25 km'), 'no (it's only 24 km').	B1	'15 miles is 24 km' with no statement is B1B0. Accept a one word decision of 'Yes' or 'No' as a statement.
Alternative method *Sight of 8 km ≡ 5 miles or equivalent.*	*B1*	*Allow a more accurate conversion* *(8 km ≡ 4·97 to 5 miles).* *Do not accept 5 km ≡ 3 miles*
Shows 25 km to be 15·625 miles AND a valid statement e.g. *'yes (it's just over 15 miles'), 'no (it's over 15 miles)'.*	*B1*	*'25 km is 15·625 miles' with no statement is B1B0.* *Accept a one word decision of 'Yes' or 'No' as a statement.*

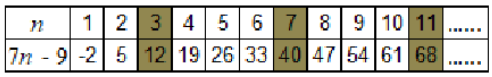
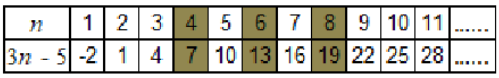
10. 4(3a – 7) + 2(5a + 4) or equivalent. = 12a – 28 + 10a + 8 or equivalent. = 22a – 20 (cm) or 2(11a – 10) (cm)	B1 B1 B1	For a correct expression for the perimeter. For removal of brackets FT only from 2(3a – 7) + (5a +4) or equivalent OR 2(3a – 7) + 2(5a +4) or equivalent. For collection of terms FT if of equivalent difficulty. Mark final answer.
Alternative approach *2[2(3a –7) + (5a + 4)]* *= 12a – 28 + 10a + 8 or 2(6a – 14 + 5a +4)* *= 22a – 20 (cm) or 2(11a – 10) (cm)*	*B1* *B1* *B1*	*For a correct expression for the perimeter.* *For removal of brackets (within 'square brackets')* *FT only from* *2 [2(3a – 7) + 2(5a +4)] or equivalent.* For collection of terms *FT only from* *2 [2(3a – 7) + 2(5a +4)] or equivalent.* *FT if of equivalent difficulty.* *Mark final answer*
11. (number of part-time in North Wales =) $\frac{90}{360} \times 96$ OR (number of full-time in North Wales =) $\frac{144}{360} \times 150$ (number of part-time in North Wales =) 24 (number of full-time in North Wales =) 60 (Probability from North Wales =) $\frac{84}{246}$ or equivalent ISW	M1 A1 A1 A1	Or equivalent *Answers may be seen on the diagram.* An answer (or sight) of 24 implies M1. An answer (or sight) of 60 implies M1. FT ('their 24' + 'their 60') /246 provided M1 gained and ('their 24' + 'their 60') < 246. Penalise incorrect notation –1. e.g. '84 in 246'.
12. One correct evaluation $2 \le x \le 3$ 2 correct evaluations $2{\cdot}25 \le x \le 2{\cdot}45$, one < 20, one > 20. 2 correct evaluations $2{\cdot}25 \le x \le 2{\cdot}35$, one < 20, one > 20. $x = 2{\cdot}3$	 B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if <20 or >20. If evaluations not seen accept 'too high' or 'too low'.* *Look out for testing $x^3 + 3x - 20 = 0$* x / $x^3 + 3x$ 2 / 14 2·1 / 15·561 2·2 / 17·248 **2·3** / **19·067** **2·4** / **21·024** 2·5 / 23·125 2·6 / 25·376 2·7 / 27·783 2·8 / 30·352 2·9 / 33·089 3 / 36 2·25 / 18·140…. **2·35** / **20·027….** 2·45 / 22·056…. *Note* *Evidence for M1 must be **seen** before A1 can be awarded.*

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

11.(a) –4 –2	B2	B1 for each
11. (b) At least 5 correct plots and no incorrect plot. A smooth curve 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 or vertically of the point).
11. (c) –2·6 AND 1·6	B1	Strict 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).

15. (a) Any n, as a whole number, which results in $7n-9$ being a multiple of 4	B2	Answer space takes precedence and must not be from incorrect working. Do not ignore crossed-out work for this question. Award B1 for any one of: • any 2 correctly evaluated terms in the sequence $7n-9$ (i.e. not leading to, or not recognised as leading to, a multiple of 4 for their choice of n) or • setting up an equation $7n-9=4\times k$ (where $k \geq 1$ and a whole number) and attempt to solve • a correct value of n substituted in $7n-9$, but contradiction or no answer given on answer line (e.g. 7×3 – 9 = 12 and 12 written on answer line or answer line left blank)  Note: Award B0 for a correct value of n from incorrect working e.g. if 7 × 4 – 9 = 19, then n = 19 on the answer line.
15. (b) Any n, as a whole number, which results in $3n-5$ being a prime number	B2	Answer space takes precedence and must not be from incorrect working. Do not ignore crossed-out work for this question. Award B1 for any one of: • any 2 correctly evaluated terms in the sequence $3n-5$ (i.e. not leading to, or not recognised as leading to, a prime number for their choice of n) or • setting up an equation $3n-5$ = a prime number and attempt to solve • a correct value of n substituted in $3n-5$, but contradiction or no answer given on answer line (e.g. 3×4 – 5 = 7 and 7 written on answer line or answer line left blank) • a correct value of n substituted in $3n-5$, but n contradicted for their workings (but n still leads to a prime number) given on answer line (e.g. 3×4 – 5 = 7 and 12 written on answer line or answer line left blank).  Note: Award B0 for a correct value of n from incorrect working e.g. if 3 × 4 – 5 = 13, then n = 13 on the answer line.

n	1	2	3	4	5	6	7	8	9	10	11	.....
$7n-9$	-2	5	12	19	26	33	40	47	54	61	68	.....

n	1	2	3	4	5	6	7	8	9	10	11	.....
$3n-5$	-2	1	4	7	10	13	16	19	22	25	28	.....

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

6(a) Whale indicated or implied on bearing 010° from Aberporth and 280° from Aberystwyth.	B2	Accept indication from one bearing line drawn with the second bearing shown on this line, including one line terminating at the correct intersection point B1 for either of the bearings correctly shown or unambiguously indicated, e.g. by an unambiguous mark on the correct bearing
Region in the sea inside a circle, centred at the whale, of correct (4cm) radius ± 2mm	B2	FT 'their position of the whale' For B2 the region must be entirely within the sea or on FT indicated as a region within the sea Allow intention of circle provided it lies completely within the tolerance given by the overlay B1 for (intention of a) circle, radius out of tolerance but within ± 4 mm, centred at the whale including any region on the land
6(b) $20 \times 12 \times 2.5 \div 100$	M2	M1 for any 3 of these 4 terms correct in a calculation which may be shown in stages
6 (m)	A1	CAO Answer given within the statement takes precedence Sight of 600 is awarded M1 and also SC1 provided not from incorrect working

6(c)(i) $\frac{13}{20}$ (× 100) or $\frac{12.5}{20}$ (× 100) or $\frac{12.8}{19}$ (× 100) or $\frac{12}{20}$ (× 100) or $\frac{12}{19}$ (× 100) or $\frac{12.8}{20}$ (× 100) or $\frac{13}{19}$ (× 100) or equivalent OR A trial and improvement method, considering percentages or decimals of 19 or 20 with a correct calculation shown between (60% of 19) 0.6 × 19 (= 11.4) and (70% of 20) 0.7 × 20 (= 14) inclusive	B1	Allow: • fraction written as division, e.g. 13 ÷ 20 • inclusion of consistent change of place value • a similar suitable fraction, e.g. 12/18
An answer in the inclusive range 60(%) to 70(%)	B1	Only award if B1 previously awarded, however allow B2 for an unsupported answer in this range. If no marks, award SC1 for any of the following answers: • 50(%) from $\frac{10}{20}$ (× 100) or equivalent • 52(%) to 53(%) from $\frac{10}{19}$ (× 100) or equivalent
6(c)(ii) (19 – 0.1 × 19) × 1000 000 000 or (19 – 0.1 × 19) × (1) × 10^9 or 0.9 × 19 × 1000 000 000 or 1.9 × 10^{10} × 9 × 10^{-1} or equivalent	M2	M1 for any one of the following: • for sight of digits 171 irrespective of place value • 19 – 0.1 × 19 • 19 billion – 0.1 × 19 billion • (19 – 0.1 × 19) × 1000 million • 0.9 × 19 • 1.9 × 10^{10} (19 billion in standard form) • 1.9 × 10^9 only if clearly calculated from 10% of 19 billion
1.71 × 10^{10}	A2	A1 for any of the following: • 17 100 000 000 • 1.71 × 10^4 million • equivalent correct value not given correctly in standard form, e.g. 17.1 × 10^9 • an answer of 1.7 × 10^{10} OR A1 for FT from M1 or M2 • 'their number' given correctly in standard form provided it is > 1.71 × 10^6 (including for the number in the last bullet point listed for M1) A0 for 17.1 billion or 17 100 million (M1 A0) Treat use of an estimate of 19 as a MR-1 from an accuracy mark, e.g. use of 20 gives an answer of 1.8 × 10^{10}, award (M2 A2 MR-1) 3 marks

7. 34·3	B2	Mark final answer. Award B1 for one of the following: • 34(·27167.....) • 34·2.

7(a) $4500 \times (1 - 0.2(0)) \times (1 - 0.14)^9$ or $4500 \times 0.8(0) \times 0.86^9$ or equivalent	M2	For M2, do not ignore any additional years considered, unless 10 years selected or implied in later working M1 for equivalent of one of the following (which may be embedded in other working): • $4500 \times (1 - 0.2(0))$ (= 3600) • $4500 \times 0.8(0)$ (= 3600) • $4500 \times (1 - 0.14)^9$ (= 1157.97...) • 4500×0.86^9 (= 1157.97...)
An answer in the range (£)926.35 to (£)926.40	A1	An answer for 10 years (not beyond) must be selected Allow an answer of (£)926 provided not from rounding an amount outside the range given Award M1, SC1 for an answer $(4500 \times 0.8 \times 0.86^{10} =)$ (£)796.68(5....) or (£)796.69 or (£)796.70 or (£)797
7(b) $100 \times 750 \div 125$ or $100 \times \frac{750}{125}$ or equivalent	M1	
(£) 600	A1	Answer space takes precedence
7(c)		Accept equivalents using the sine rule throughout '½ width' may be referred to by any unknown
Sight of appropriate 80 (cm) (height of triangle)	B1	Check if indicated on the diagram
(½ width =) $\frac{80}{\tan 33°}$ or (½ width =) $80 \times \tan(90° - 33°)$	M2	(= 123.189... cm or 123.2 cm) FT 'their 80' provided ≤ 120 and ≠ 90 M1 for sight of $\tan 33° = \frac{80}{\text{½ width}}$ or $\tan(90° - 33°) = \frac{\text{½width}}{80}$
× 2	m1	FT provided at least M1 previously awarded, i.e. for intention to double 'their ½ width'
(Width of garage is) 246(cm) to 246.4(cm)	A1	CAO. ISW
7(d) (Maximum space =) 555 – 395 – 70 or 550 – 400 + 2 × 5 – 70 or equivalent	M2	Check the diagram M1 for any of the following: • **use** of 550 < 'their 555' ≤ 560 AND 390 ≤ 'their 395' < 400 • for sight of 555 and 395 • for sight of 550 – 400 + 2 × 5
90 (cm)	A1	CAO Award M1 and SC1 for an answer of (555 – 395 =) 160 (cm)

12. One correct evaluation $1 \le x \le 2$ 2 correct evaluations $1{\cdot}15 \le x \le 1{\cdot}35$, (one value < 0, one value > 0) 2 correct evaluations $1{\cdot}15 \le x \le 1{\cdot}25$, (one value < 0, one value > 0) $x = 1{\cdot}2$	B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if < 0 or > 0.* *Look out for testing* $x^3 + 5x = 8$ *or equivalent* *If evaluations not seen accept 'too high' or 'too low'.*

x	$x^3 + 5x - 8$		
1	-2		
1.1	-1.169		
1.2	**-0.272**		
1.3	**0.697**		
1.4	1.744	1.15	-0.72913
1.5	2.875	1.22	-0.08415
1.6	4.096	1.23	0.010867
1.7	5.413	1.24	0.106624
1.8	6.832	**1.25**	**0.203125**
1.9	8.359	1.35	1.210375
2	10		

15. 34·3	B2	Mark final answer. Award B1 for one of the following: • 34(·27167.....) • 34·2.
16.(a) 1 – (0·08 + 0·2 + 0·28) or equivalent = 0·44 or equivalent.	M1 A1	For the complete method. If no marks awarded, award SC1 for 55 pupils for Ysgol Bryn.

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.

1(a) **No and** suitable reason given e.g. 'because on Friday he walked less than 10000 steps' 'because Friday is (only) 9754' 'because Friday is below 10000'	E1	Ignore spurious comments if No indicated and an appropriate reason is given. Allow the following with **no** indicated: 'because Friday is less' 'didn't walk 10000 on Friday' 'Friday didn't walk to 10000' 'Friday didn't achieve 10000' 'The first 4 days he did but the last day he only got a 4-digit number' 'because Friday was 9000' Do not allow 'Yes' indicated with a reason e.g. 'Glen has achieved his target' 'Friday is nearly 10000' 'he has achieved at least 10000 steps because 9754 is closer to 10000 than 9000 if rounded up'
1(b) 8285 (steps)	B2	Allow embedded answers such as 58285 – 8285 = 50000 Award B1 for any one of the following: • 10672 + 13586 + 12341 + 11932 + 9754 – 50000 • subtracting 50000 from an attempt at adding the 5 given values • 58285 – 50000 • 58285
1(c) 13600	B1	

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

2(a) **Airport** / **Number of passengers (to the nearest million)** Cardiff — **2 000 000** Bristol — 9 000 000 Birmingham — **12 000 000** Exeter — **1 000 000** Leeds-Bradford — 4 000 000 Airport **Cardiff** Bristol ( ) **Birmingham** **Exeter** **Leeds-Bradford**	B1 B1 B1 B3	Answers in the table and pictogram take precedence. Accept the word million used eg 2 million Penalise -1 only for **consistent** use of incorrect place value for all 3 values. Award B3 for all 4 correct entries Award B2 for 3 correct entries Award B1 for 2 correct entries FT 'their values stated in the table' FT implied use of million (i.e. with incorrect place value given in the 1st table but then used as million in the pictogram) If a different symbol that is split into 4 is consistently used, then penalise -1 only. If a different scale used then B0.
2(b)(i) Yes and suitable reason given e.g. 'half of 80 million is 40 million (and 46 086089 is more than 40 million)' '46 million is more than 40 million (which is half of 80 million)' 'Double 46 million is 92 million (which is more than 80 million)' 'because half is 40000000 so Gatwick had more than half' 'because half of 80000000 is forty million (but Chris was correct because it was 46086089 which is more than half)' '46086089 million is more than half of eighty million (as 40000000 is half of it)' 'because 46086089 doubled is greater than 80000000'	E1	Allow yes and 'half of 80 is 40' Do not allow no with a suitable reason e.g. 'No, because half of 80 is 40 and Chris had 46 so he had extra people' 'No, because half of 80 million is 40 million and there was 46 million used in Gatwick'
2(b)(ii) 261 909	B1	
2(c) 2508 × 3 or 2508 + 2508 + 2508 or equivalent 7524 (litres)	M1 A1	For 2508 + 2508 + 2508, allow if no addition sign seen but addition is implied award M1.

3(a)(i) (For Aber to Cwm:) 6 (miles) (5.9 to 6.1)	B2	For B2, FT 'their distance measured' × 0.5 correctly evaluated provided the distance is in the range 11.8 to 12.2 cm Award B1 for: • distance measured as 12(cm) (±2mm) • 'their **stated** distance measured outside the range 11.8 to 12.2 cm' × 0.5 correctly evaluated
3(a)(ii) (For Aber to Borth to Dinas:) 4 (miles) (3.8 to 4.2)	B2	FT 'their distance measured' × 0.5 correctly evaluated provided the distance is in the range 7.6 to 8.4 cm Award B1 for: • Total distance measured as 8(cm) (±4mm) • 2 distances seen as 3(cm) (±2mm) AND 5(cm) (±2mm) • 'their **stated** distance measured outside the range 7.6 to 8.4 cm' × 0.5 correctly evaluated • 1.5 (miles) or 2.8 to 3.2(cm) × 0.5 correctly evaluated (for Aber to Borth) • 2.5 (miles) or 4.8 to 5.2 (cm) × 0.5 correctly evaluated (for Borth to Dinas)

3(b) (Perimeter=) 106 + 68 + 106 + 68 or equivalent 348 (m)	M1 A1	
5000 ÷ 348 or 348 × 15 or 348 × 14	M1	Division may be seen as repeated addition/subtraction or repeated trials. Allow 348 × 13 (= 4524) Allow 348 × 16 (= 5568) FT 'their derived perimeter' including partial perimeter but not use of 106 or 68 Use of area gains no marks
15 (laps)	A2	Accept a unique embedded answer for A2 or A1 e.g. Award A2 if only 348 × 15 = 5220 seen e.g. Award A1 if only 348 × 14 = 4872 seen Award A1 if both 348 × 15 = 5220 AND 348 × 14 = 4872 seen with **no** final answer given for the number of laps. Award A1 for 14 or 14.4 or 14.37 or 14.3(6…..) or 14.5 seen. FT 5000 ÷ 'their 348' for possible A2 or A1. On FT, award A2 provided they have rounded **up** to the nearest whole number. Otherwise award A1 for a correctly evaluated answer for 5000 ÷ 'their 348' without rounding up. If on FT the answer is a whole number with no rounding required award A1 only. <u>For use of partial perimeter of 174cm</u> 5000 ÷ 174 = 29 laps award M0A0M1A2 5000 ÷ 174 = 28.7… award M0A0M1A1 If trials used (apply in line with the MS above): • For 174 × 29 = 5046 Award M0A0M1A2 • For 174 × 28 = 4872 Award M0A0M1A1 • For 174 × 27 (= 4698) Award M0A0M1A0 • For 174 × 30 (= 5220) Award M0A0M1A0 Note: if 4872 seen from repeated addition but 28 laps not seen award M0A0M1A0 (need a value for the number of laps or an embedded value of the number of laps)

5.(a)	120	B2	**120 must come from correct working.** Unsupported 120 is awarded B2. Award B1 for one of the following: • sight of 117(·0631…) rounded or truncated. • an answer of 120 from 117·…
5.(b)	141·2	B2	**141·2 must come from correct working.** Unsupported 141·2 is awarded B2. Award B1 for one of the following: • 141(·183…) rounded or truncated • $\frac{74\sqrt{91}}{5}$ • an answer of 141·2 correctly rounded from 141·1….. or 141·2…..

(=) 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

8(a)(i) (2.5, 42) stated with a suitable line of best fit drawn through this point	B2	For B2 do not ignore the answer space stating an incorrect point, or giving reverse coordinates
		
		Conditions of a suitable line of best fit:
		• The straight line (accept intention if a ruler is not used) must have points above and below it
		• The line must be of sufficient length, to illustrate trend for at least 6 points
		• The trend shows that there are points above and below the line towards each end of the line
		
		For B2 the point (2.5, 42) **must** be stated or plotted with a suitable line of best fit through this point.
		If (2.5, 42) is not stated or plotted, then it is only possible to award a maximum of B1
		
		Allow B2 for one of the following:
		• a blank answer space with (2.5, 42) plotted with a suitable line of best fit through (2.5, 42)
		• (2.5, 42) stated in the answer space, but not plotted, with suitable line of best fit passing through (2.5, 42)
		
		B1 for sight of any one of the following:
		• (2.5, 42) stated in the answer space
		• blank answer space with (2.5, 42) indicated by a correct plot
		• A suitable line of best fit for the given points:
		  ○ with no additional point plotted
		  ○ passing through 'their additional incorrect point' (plotted)
		  ○ suitable if 'their additional incorrect point' plotted is ignored

8(a)(ii) Reading from line of best fit for number of cups (tolerance to the nearest gridline) for rainfall of 2.0 mm	B1	Answer space takes precedence **STRICT FT** from (a)(i) 'their line of best fit' which must be drawn for negative correlation No mark is awarded if no line of best fit drawn in (a)(i)
8(b) $5 \times 18 + 5 \times 0.5$ or 18.5×5 92.5 (cm)	M1 A1	Allow for $18 <$ 'their 18.5' ≤ 19 CAO If no marks, award SC1 for sight of 18.5 (cm) or 18.4999(... cm) provided clearly a recurring 9 digit
8(c) Selects or unambiguously implies 'No' with a reason, e.g. '(Space) minimum 97.25 (cm) (which is less than 97.3 cm)'	E1	Allow 'No' with a reason, e.g. '97.25 (cm)' '(least) 97.25 and (greatest) 97.75' Do not accept 'No' with the reason, e.g. '97.75 (cm)'

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

14.(a)	120	B2	**120 must come from correct working.** Unsupported 120 is awarded B2. Award B1 for one of the following: • sight of 117(·0631…) rounded or truncated. • an answer of 120 from 117·…
14.(b)	141·2	B2	**141·2 must come from correct working.** Unsupported 141·2 is awarded B2. Award B1 for one of the following: • 141(·183…) rounded or truncated • $\frac{74\sqrt{91}}{5}$ • an answer of 141·2 correctly rounded from 141·1….. or 141·2…..

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. $(AC^2 =)\ 8^2 + 4{\cdot}5^2$ or equivalent $(AC =)\ \sqrt{8^2 + 4.5^2}$ or equivalent 9·18 (cm)	M1 m1 A2	Check diagram. note: $(AC^2 =)\ 64 + 20{\cdot}25$. note: $(AC =)\ \sqrt{84{\cdot}25}$. FT √'their 84·25' for m1 only provided M1 gained. Mark final answer for A2. CAO. Award A1 for one of the following: • 9·17(878…) rounded or truncated to at least one decimal place • $\frac{\sqrt{337}}{2}$. Final answer of • ***AC*** = 84·25 is M1m0A0.
16. Alternative method to find AC using Trig *A correct and complete method (using trigonometric relationships)* *(AC =) 9·18 (cm)*	*M2* *A2*	CAO. Mark final answer. *Award A1 for one of the following:* • *9·17(878…) rounded or truncated to at least one decimal place* • $\frac{\sqrt{337}}{2}$.

17.

One correct evaluation $3 \le x \le 4$	B1	*Correct evaluation regarded as enough to identify if* < 80 *or* > 80.
2 correct evaluations $3{\cdot}75 \le x \le 3{\cdot}95$, **(one value < 80, one value > 80)**	B1	*If evaluations not seen accept 'too high' or 'too low'.* *Look out for* $x^3 + 6x - 80 = 0$
2 correct evaluations $3{\cdot}75 \le x \le 3{\cdot}85$, **(one value < 80, one value > 80)**	M1	
$x = 3{\cdot}8$	A1	

x	$x^3 + 6x$		
3	45		
3.1	48·391		
3.2	51·968		
3.3	55·737		
3.4	59·704		
3.5	63·875		
3.6	68·256	3.75	75·2343..
3.7	72·853	3.84	79·6631..
3.8	77·672	**3.85**	**80·1666..**
3.9	82·719	**3.95**	**85·3298..**
4	88		

Unsupported $x = 3{\cdot}8$ is awarded B0B0M0A0.
An answer of $x = 3{\cdot}8$ can only be awarded M1A1, following sight of 2 correct evaluations
$3{\cdot}75 \le x \le 3{\cdot}85$
(one evaluation < 80, one evaluation > 80).

If 3·85 is given as 80 (truncated) award M0 A0 unless 'too high' or equivalent is indicated.

Unit 1: Foundation Tier	Mark	Comments
1.(a) 562000	B1	
1.(b) 42900	B1	Accept forty-two thousand (and) nine hundred

2.(a) 0·5 kg	B1	
2.(b) 24 km	B1	

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

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

9.(a)(i) 49	B1	B0 for 7×7
9.(a)(ii) 9	B1	B0 for 9×9
9.(b)(i) 19·7	B1	CAO B0 for 19·70(0…)
9.(b)(ii) 65·428	B1	CAO B0 for 65·4280(0…)

9. (Circumference =) $2 \times \pi \times 38$ or $\pi \times 76$	M1	
an answer between 238·6 and 239 inclusive (cm)	A1	Award A1 for sight of 76π.
240 (cm)	B1	Award B0 for 240·0(00…). FT 'their circumference' correctly given to 2 significant figures, provided > 100 and π has been used. An unsupported final answer between 238·6 and 239 inclusive (cm) is awarded M1A1B0. An unsupported final answer of 240 (cm) is awarded M1A1B1.

Unit 1: Foundation Tier	Mark	Comments
11. 5, 7, 7, 9 (in any order)	B3	Answer boxes take precedence. Four numbers must be given for B3 or B2 to be awarded B3 for 7, 7, 5, 9 B2 for mode = 7 AND total = 28 • 7, 7, a, b where a+ b = 14 and a and b can be any numbers (negative, fractions, decimals, even number or ≥10) e.g. 7, 7, 2, 12 • NOT 7, 7, 7, 7 At least 2 numbers must be given for B1 to be awarded. B1 for mode = 7 OR total = 28 Examples include: • 7,7,7,7 • 7,7,7,14 (mode = 7, total ≠ 28) • 7, 7, blank, blank (mode = 7, total ≠ 28) • 7, 3, 9, 9 (mode ≠ 7, total = 28) • 7, 9, 12, blank (mode ≠ 7, total = 28) B1 for 7,7,14, blank (mode = 7, total = 28) B0 for 7, blank, blank, blank,

17. (Area =) $\pi \times 8{\cdot}7^2$ $= 238\ (\text{cm}^2)$	M1 A2	Award A1 for sight of one of the following: • $237(\cdot\ldots)$ • $75\,{}^{69}/_{100}\,\pi$ • ${}^{7569}/_{100}\,\pi$

4(a)(i) 045(°) (± 3°)	B1	Do not accept 45(°) (± 3°)
4(a)(ii) 243(°) (± 3°)	B1	
4(a)(iii) An unambiguous answer of 8 (km) or an answer in the range 7.68 (km) to 8.32 (km)	B2	This must be an unambiguous answer, do not award if another distance is also given as a final answer, e.g. • 5 miles = 8 km final answer 7 km • 5 miles = 8 km with final answer 8 ÷ 5 = 1.6 B1 for any one of the following: • (5 cm =) 5 miles = 8 km with a further incorrect calculation or distance • 5 (± 0.2) × 1.6 • 5 (± 0.2) × 8 ÷ 5 • 5 (± 0.2) × 1.609 • 5 (± 0.2) × 1.61 B0 for 5 (± 0.2) × 1.5
4(b)(i) Answer in the inclusive range 14.45 (lumens) to 14.5 (lumens)	B1	
4(b)(ii) Answer in the inclusive range 1.07 (candelas) to 1.075 (candelas)	B1	
4(c) Any value in the range 19 to 20	B2	Accept from reverse working Answer space takes precedence, if blank allow an unambiguous embedded answer in the range B1 for sight of unambiguous appropriate working, e.g. any of the following examples or similar: • 1 000 000 ÷ 52 000 • 1 000 000 ÷ 50 000 • $\frac{1\,000\,000}{52\,000}$ • $\frac{1\,000\,000}{50\,000}$ • $\frac{1000}{50}$ • $\frac{1000}{52}$

5(a) 25400 or twenty-five thousand (and) four hundred	B1	
5(b) 61	B1	
5(c) 2500(g)	B2	B1 for any one of the following: • $\frac{10 \times 1000}{4}$ • 10000 ÷ 4 • 2.5 • the consecutive digits 2 and 5 in an answer with no other non-zero digits e.g. 0.25, 25, 250,… • 'their derived 10 ÷ 4' × 1000 • an answer of 2200

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

10(a) $0.03 \times 4000 + 4000$ or 1.03×4000 (= £4120) or equivalent	M1	Allow for sight of one of the following: • 4120 (irrespective of labelling) • 4240 (simple interest)
$0.03 \times 4120 + 4120$ or 1.03×4120 or equivalent	M1	FT 'their 4120' (the mark is for the method) (= £123.6(0) + £4120)
(£)4243.6(0)	A1	CAO. Answer space takes precedence if completed, otherwise mark final answer for the amount If no marks, award SC1 for (£)3763.6(0) (from depreciation)
10(a) Alternative method *Sight of $1.03^2 \times 4000$* *1.0609×4000* *(£)4243.6(0)*	*M1* *A1* *A1*	*CAO. Answer space takes precedence if completed, otherwise mark final answer for the amount* *If no marks, award SC1 for (£)3763.6(0) (from depreciation)*
10(b)(i) $100 \times 42 \div (100 + 40)$ or $42 \div 1.4$ or equivalent	M1	
(£) 30	A1	CAO. Answer space takes precedence Accept a correct answer from trial and improvement

10(b)(ii) (Volume of gold = mass ÷ density =)
$6 \times 10^{-3} \times 1000 \div 20$
or $6 \div 20$
or $6 \times 10^{-3} \div (20 \div 1000)$
or $6 \times 10^{-3} \div 0.02$
or equivalent
	M2	Must be dimensionally correct
		
		M1 for any one of the following:
		• sight of $6 \times 10^{-3} \times 1000$ (= 6 g)
		• sight of $20 \div 1000$ (= 0.02 kg/cm^3)
		• method with incorrect place value, 'their mass' ÷ 'their density' provided that
		  • the only non-zero digit in 'their mass' = 6 and
		  • the only non-zero digit in 'their density' = 2
		e.g. $6 \times 10^{-3} \div 20$, $6 \times 10^{-3} \div 0.2$, $600 \div 20$, $6000 \div 20$

0.3 (cm^3) or $\frac{3}{10}$ (cm^3)	A1	CAO, allowing 3×10^{-1} (cm^3)

End of solutions