REVISE
.wales

F1.18 — Maps, scale drawings & bearings

Mark schemes for the F1.18 question pack

Spec 3.3.1, 3.3.2, 3.3.3, 3.3.4 — Unit 1

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 83 questions in the corresponding revise.wales question pack (87 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. *Pack layout © revise.wales.*

			3	Unsupported correct answer gains B1 only.
3.(a)	Correct reflection.		B1	B0 if additional shapes.
3.(b)	Correct enlargement.		B2	**Use overlay.** Allow any orientation. B1 for one side correctly enlarged. SC1 for an enlargement by a factor of 2 or 4.
3.(c)	Correct translation		B1	

7(a). $x + 2x + 3x + 90 = 360$ or equivalent.	✓	M1	Allow M1 for attempting sum of a + b + c + 90 with ratio a:b:c = 1:2:3 and clearly using trial and improvement to aim for a total of 360.
$6x = 270$	✓	A1	
$x = \frac{270}{6}$	✓	A1	F.T. from ax = b.
$= 45$	✓	A1	Allow SC2 for an answer of 15 (from '= 180')
7(b) Correct use of $2x = 90(°)$		B1	F.T. 'their value of x'. Must be used in justification.
'Yes' AND correct justification. e.g. 'Yes because of interior angles', 'Yes as lines are perpendicular to the base' 'Both A and B are 90'		E1	Dependent on B1 with F.T. justification. *Alternative method for the B1 mark* Use of $2x = 135(°)$ AND $x = 45(°)$

13. Correct enlargement.		B2	Allow any orientation. B1 for one side correctly enlarged. SC1 for an enlargement by a factor of 2 or 4.

		FALSE		
14.	(7 × 3 =)	21	B2	B1 for sight of 7 × a (or a × 7) OR b × 3 (or 3 × b) OR 7 OR 3 unambiguously identified

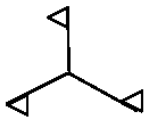
				Mark final answer.
14.	$16{\cdot}9^2 = 6{\cdot}5^2 + MN^2$ or equivalent.		M1	Allow M1 for $16{\cdot}9^2 - 6{\cdot}5^2$.
	$(MN^2) = 243{\cdot}36$ or $(MN) = \sqrt{243{\cdot}36}$		A1	
	$(MN =) \ 15{\cdot}6 (cm)$		A1	CAO

15. (Team A) 12 (Team B) 3		B2	B1 for values that satisfy A – B = 9 OR A = 4 × B. e.g. final working line of 10 and 1 (or 8 and 2) would be awarded B1 if not contradicted in the answer space. SC1 for reversed answer A = 3 and B = 12.

				If no marks awarded allow SC1 for 11 or 13 or 17.
15.	(volume) Area Length None Area Volume		B3	*Must use the terminology given in the question.* B3 for all 5 correct. B2 for 3 or 4 correct. B1 for 2 correct. B0 otherwise.

17.(a) $x + 2x + 3x + 90 = 360$ or equivalent $6x = 270$ $x = \frac{270}{6}$ $= 45$	✓ ✓ ✓ ✓	M1 A1 A1 A1	Allow M1 for attempting sum of a + b + c + 90 with ratio a:b:c = 1:2:3 and clearly using trial and improvement to aim for a total of 360. F.T. from ax = b. Allow SC2 for an answer of 15 (from '= 180')
17.(b) Correct use of $2x = 90(°)$ 'Yes' AND correct justification. e.g. 'Yes because of interior angles', 'Yes as lines are perpendicular to the base' 'Both A and B are 90'		B1 E1	F.T. 'their value of x'. Must be used in justification. Dependent on B1 with F.T. justification. *Alternative method for the B1 mark* *Use of* $2x = 135(°)$ *AND* $x = 45(°)$

12.(a)	48°	B1	
12.(b)	East	B1	
[illegible]	[illegible]	[illegible]	

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

14.(a)	$1{\cdot}56 \times 10^5$	B2	Mark final answer. B1 for sight of $15{\cdot}6 \times 10^5$ OR 1560000 OR equivalent correct value but not in standard form.
14.(b)	$1{\cdot}3 \times 10^5$	B2	Mark final answer. B1 for sight of 13×10^4 OR 130000 OR

			For this question A1 can only be awarded if M1 given.
14.(a)	225	B2	Mark final answer. Allow $\sqrt{225}$ (= 15) as an indication of correct answer and award B2. B1 for unambiguous indication that HCF is 15. B1 only for 15^2 if not shown to be 225.
14.(b)	0.6	B2	Mark final answer. B1 for sight of 3.2

15. (i)	9	B1	Mark final answer.
15. (ii)	−5	B1	Mark final answer.

2.(a) Correct scale drawing BAC = 55° AB = 6cm AND AC = 8cm AND triangle drawn	 B1 B2	Allow tolerance of ±2mm and ±2°. Labelling need not be shown if vertices can be unambiguously identified. B1 for AB = 6cm OR AC = 8cm.
2.(b) Length of 'their BC' × 3 = 20·1	 M1 A1	Allow tolerance of ±2mm for 'their BC'. FT from 'their BC'. ISW if correct evaluation seen (eg 20·1 rounded to 20) If no attempt at 2(a) then allow SC1 for an answer between 10·2 and 11·4 inclusive.

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

14.	Median value > 6	B1	Possible to allow if enough boxes completed to ensure median > 6.
	Total of five numbers < 40	B1	All boxes must be completed.
	Range < 12	B1	All boxes must be completed.
			Penalise −1 once from any marks gained if a negative number or a number ≥ 20 or non-whole numbers used.

14.(a)	(m =) 9·6	B1	Mark final answer. Allow embedded answer. B1 for 9·6/2 or 9·6/2 = 4·8 with no further work. B0 for 9·6/2 followed by 'm ≠ 9·6'.
14.(b)	−2	B1	B0 for −2n. Mark final answer.

14.

Correct evaluation regarded as enough to identify if 'too high' or 'too low'. If evaluations not seen accept 'too high' or 'too low'.

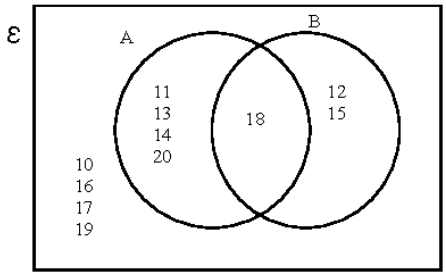
		x	$x^3 - 13x$ (or check $x^3 - 13x - 107=0$)		
One correct evaluation $5 \le x \le 6$	B1				
2 correct evaluations $5{\cdot}55 \le x \le 5{\cdot}75$, one < 107, one > 107.	B1				
		5	60		
2 correct evaluations $5{\cdot}65 \le x \le 5{\cdot}75$, one < 107, one > 107.	M1	5·1	66·351		
		5·2	73·008		
		5·3	79·977		
$x = 5{\cdot}7$	A1	5·4	87·264		
		5·5	94·875		
		5·6	**102·816**	5·55	98·803...
		5·7	**111·093**	**5·65**	**106·912...**
		5·8	119·712	5·655	107·326...
		5·9	128·679	5·75	115·359...
		6	138		

15.(a) Correct scale drawing BAC = 55° AB = 6cm AND AC = 8cm AND triangle drawn	 B1 B2	Allow tolerance of ±2mm and ±2°. Labelling need not be shown if vertices can be unambiguously identified. B1 for AB = 6cm OR AC = 8cm.
15.(b) Length of 'their BC' × 3 = 20·1	 M1 A1	Allow tolerance of ±2mm for 'their BC'. FT from 'their BC'. ISW if correct evaluation seen (eg 20·1 rounded to 20) If no attempt at 15(a) then allow SC1 for an answer between 10·2 and 11·4 inclusive.

16.	$x + 7 + 8 = 18$ or equivalent. $x = 3$	M1 A1	May be seen on the diagram OR implied by 3 + 7 + 8 (= 18) for M1 A1.
	(Area =) $6 \times (3 + 2)$ $= 30(cm^2)$	M1 A1	F.T. 'their derived or stated value for x'.

19.(a)	214°	B1	
19.(b) (i)	A	B1	
19.(b) (ii)	E	B1	

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 =) $0{\cdot}18 \times 170.66$ $= (£)30.72$	*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 =) $0{\cdot}12 \times 256$ $= (£)30.72$	*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

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

13. Correct construction <u>method</u> for perpendicular bisector with line drawn. Correct construction <u>method</u> for 60° at point A. Correct construction <u>method</u> for bisecting an angle with line drawn. Point P clearly identified	 B1 B1 B1 B1	*Correct construction arcs must be seen for the first three B1 marks.* <u>Two</u> pairs of Intersecting arcs (centres at A and B) Allow if drawn at point B. Allow B1 for correct method (tolerance will be penalised with final B0). FT 'their angle of 60°' drawn at point A or point B. C.A.O. within tolerance. Intersecting lines alone with no indication that this is point P is <u>not sufficient</u> for this B1. Do not penalise if both possible positions shown. Final B1 may be awarded after B0B0B0.
<u>13. Alternative method</u> *Correct construction method for 60° at point A (or B).* *Correct construction method for bisecting the angle at A (or B) with line drawn.* *Repeating the above two stages at B (or A)* *Point P clearly identified*	 *B1* *B1* *B1* *B1*	*Correct construction arcs must be seen for the first three B1 marks* *Allow B1 for correct method (tolerance will be penalised with final B0).* *C.A.O. within tolerance.* *Intersecting lines alone with no indication that this is point P is <u>not sufficient</u> for this B1.* *Do not penalise if both possible positions shown.* *Final B1 may be awarded after B0B0B0.*
14. Sight of any TWO of 30, 2 or 0·5 OR Sight of any TWO of 30, 8 or 0·5 as appropriate approximations. $\frac{30 \times 8}{0{\cdot}5}$ or equivalent. = 480	B1 M1 A1	Allow 30·2 for 30. Equivalent e.g. $\frac{30 \times 2 \times 2 \times 2}{\frac{1}{2}}$ or $\frac{30 \times 2^3}{0{\cdot}5}$ Must be seen, but allow if attempted calculation done in steps. M0 for exact calculation. C.A.O. Allow 483·2 if 30·2 used.

14. Two relevant (sides of one double the other) rectangles or squares considered. Perimeter AND area of 1st rectangle correctly calculated. Perimeter AND area of 2nd rectangle correctly calculated. Clear statement that the perimeter has been doubled but the area has not been doubled (and that Catrin is incorrect.)	M1 B1 B1 A2	Sketch shown or lengths stated. If M0, only the B marks are available. Ignore missing units BUT penalise −1, once only, for incorrect units. (Applies to these B1 marks.) FT 'their stated values' for both perimeter and area. If not A2, then A1 for correct perimeter statement for 'their values'. OR A1 for correct area statement for 'their values'. Accept statement that area is 4 times as big. Allow for A2 'only the perimeter has been doubled'. (implies that the area has not been doubled.) *Also for A2.* *'The area is not doubled so Catrin is incorrect' answers the question.* *In this case* *Award SC1 and SC1 (instead of B1 and B1) if areas correctly calculated.* Correct statements, for BOTH perimeter and area, with **no** supporting work gains SC1.
15. (18% of £256 =) 0·18 × 256 = (£)46.08 (Larger share =) $\frac{2 \times 46{\cdot}08}{3}$ = (£)30.72 (To the nearest 10p =) (£)30.7(0)	M1 A1 M1 A1 B1	Allow (£)46.10 FT 'their stated 18%'. If M0 allow SC1 for sight of (£)15.36 FT 'their larger share' (not 'their 18%') and only if rounding required.
15. Alternative method 1 *(Larger share of £256 =)* $\frac{2 \times 256}{3}$ *=(£)170.66(..)* *(18% of £170.66 =) 0·18 × 170.66* *= (£)30.72* *(To the nearest 10p =) (£)30.7(0)*	*M1* *A1* *M1* *A1* *B1*	*Allow (£)170.70* *If M0 allow SC1 for sight of (£)85.33.* *FT 'their stated larger share'.* *FT 'their 18%' (not 'their larger share') and only if rounding required.*
15. Alternative method 2 *(Larger share of 18% =)* $\frac{2 \times 18}{3}$ *= 12(%)* *(12% of £256 =) 0·12 × 256* *= (£)30.72* *(To the nearest 10p =) (£)30.7(0)*	*M1* *A1* *M1* *A1* *B1*	*If M0 allow SC1 for sight of 6(%).* *FT 'their derived larger %'.* *FT 'their amount' only if rounding required.*

200		Penalise incorrect notation −1. e.g. '56 in 200'.
14. $\sin(QPR) = \frac{9{\cdot}6}{16{\cdot}7}$	M1	
$(QPR =) \sin^{-1}(9.6/16{\cdot}7)$ or $\sin^{-1}(0{\cdot}57..)$	m1	Implies M1.
$= 35{\cdot}1(°)$ or $35{\cdot}09(°)$ or $35{\cdot}089(...°)$	A1	Allow any answer that rounds to 35(°)
14. Alternative method.		
***Correct** use of 'two-step' method.*	M2	*A partial trigonometric method is M0.*

14. Two relevant (sides of one double the other) rectangles or squares considered. Perimeter AND area of 1st rectangle correctly calculated. Perimeter AND area of 2nd rectangle correctly calculated. Clear statement that the perimeter has been doubled but the area has not been doubled (and that Catrin is incorrect.)	M1 B1 B1 A2	Sketch shown or lengths stated. If M0, only the B marks are available. Ignore missing units BUT penalise −1, once only, for incorrect units. (Applies to these B1 marks.) FT 'their stated values' for both perimeter and area. If not A2, then A1 for correct perimeter statement for 'their values'. OR A1 for correct area statement for 'their values'. Accept statement that area is 4 times as big. Allow for A2 'only the perimeter has been doubled'. (implies that the area has not been doubled.) *Also for A2.* *'The area is not doubled so Catrin is incorrect' answers the question.* *In this case* *Award SC1 and SC1 (instead of B1 and B1) if areas correctly calculated.* Correct statements, for BOTH perimeter and area, with **no** supporting work gains SC1.
15. (18% of £256 =) 0·18 × 256 = (£)46.08 (Larger share =) $\frac{2 \times 46{\cdot}08}{3}$ = (£)30.72 (To the nearest 10p =) (£)30.7(0)	M1 A1 M1 A1 B1	Allow (£)46.10 FT 'their stated 18%'. If M0 allow SC1 for sight of (£)15.36 FT 'their larger share' (not 'their 18%') and only if rounding required.
15. Alternative method 1 *(Larger share of £256 =)* $\frac{2 \times 256}{3}$ *=(£)170.66(..)* *(18% of £170.66 =) 0·18 × 170.66* *= (£)30.72* *(To the nearest 10p =) (£)30.7(0)*	*M1* *A1* *M1* *A1* *B1*	*Allow (£)170.70* *If M0 allow SC1 for sight of (£)85.33.* *FT 'their stated larger share'.* *FT 'their 18%' (not 'their larger share') and only if rounding required.*
15. Alternative method 2 *(Larger share of 18% =)* $\frac{2 \times 18}{3}$ *= 12(%)* *(12% of £256 =) 0·12 × 256* *= (£)30.72* *(To the nearest 10p =) (£)30.7(0)*	*M1* *A1* *M1* *A1* *B1*	*If M0 allow SC1 for sight of 6(%).* *FT 'their derived larger %'.* *FT 'their amount' only if rounding required.*

			Accept non-integers for B1 marks.
5.	x = 180 −90 – 50 or equivalent = 40(°)	M1 A1	 May be seen on diagram.
	(Bearing =) 130(°)	B1	OR FT 90 + 'their'. Must be in 3 digit form

13.(a)	2	B2	B1 for sight of – 18 (not – 18x) OR B1 for sight of (+)20 (not 20y and not −20). Mark final answer.
13.(b)	6g – 9f	B2	Must be an expression for B2. B1 for sight of (+)6g OR sight of – 9f. B1 for 6g + – 9f. Mark final answer.
13.(c)	12x −20	B1	Must be shown as an expression. C.A.O. Mark final answer.

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.

	= 66(·%)	A1	An answer of 66(·%) gains BMMA1.
14.	MN = 13·5 × cos 27	M2	M1 for cos 27 = $\frac{MN}{13·5}$
	= 12(·0…) (cm) ISW	A1	*A correct and complete method (e.g. using two trigonometric relationships.)* *M2*
			MN = 12(·0…)(cm) ISW *A1*

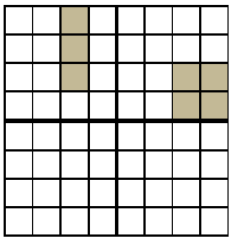
15.	x = 180 −90 – 50 or equivalent = 40(°) (Bearing =) 130(°)	M1 A1 B1	 May be seen on diagram. OR FT 90 + 'their x'. Must be in 3-digit form.

			Mark final answer.
15.(a)	3^4	B1	
15.(b)	40·84101	B1	
15.(c)	2.6	B1	

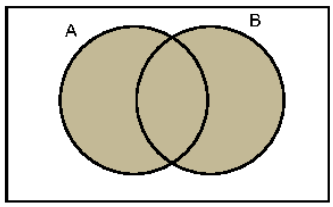
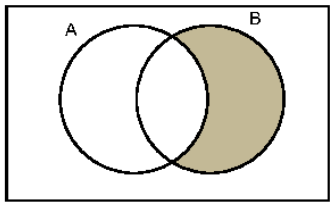
8. (Probability of Puffin Island=) 1 − 0·4 − 0·15 − 0·25 = 0·2	M1 A1	An unsupported answer of 0·56 implies M1
(Number of cards showing Puffin Island =) 0·2 × 80	M1	FT 'their stated P(Puffin Island)' × 80, only if 'their stated P(Puffin Island)' < 1.
= 16	A1	16/80 is M1A0 unless 16 has been seen.
Alternative method *(Number of cards showing other 3 islands =)* *0·4 × 80 + 0·15 × 80 + 0·25 × 80 or equivalent* *= 64*	*M1* *A1*	*Allow M1 for sight of 32 AND 12 AND 20.*
(Number of cards showing Puffin Island =) 80 – 64	*M1*	*FT 80 − 'their derived 64', only if 'their derived 64' < 80.*
= 16	*A1*	*16/80 is M1A0 unless 16 has been seen.*
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) Correct construction method. e.g. (i) intersecting arcs of radii 6cm and 9cm with centres A and C respectively. OR (ii) copying the angle at B at the point A (will require AB or BA to be extended).	M1	Relevant construction arcs must be seen.
Completed parallelogram.	A1	
9.(b) 'measured length' × 200	M1	Allow for error in measuring line XY.
= 1520 (cm)	A1	Accept only in range 1480 to 1560 inclusive.
= 15·2 metres	B1	FT 'their 1520' ÷ 100. Unsupported 14·8 to 15·6 inclusive gains all 3 marks.
Alternative method *Sight of scale is 1cm represents 2m*	*B1*	
'measured length' × 2	*M1*	*Allow for error in measuring line XY.*
= 15·2 metres	*A1*	*Accept only in range 14.8 to 15.6 inclusive.*
10.(a) 9·231	B1	
10.(b) 170	B1	
10.(c) 10	B1	
11(a) 5n − 3	B2	B1 for sight of 5n. Mark final answer.
11.(b) 17	B1	
11.(c) 2n + 2 OR 2(n + 1)	B2	If 2n + 2 is not their final answer allow B1 for sight of 2n + 2 in earlier work. B1 for a correct answer not simplified or incorrectly simplified e.g. n + n + 2.

9.(d) $4x = 10 - 7\ (=3)$ $x = \frac{3}{4}$ or equivalent.	B1 B1	FT from $4x = b$. Integer answer required if b is a multiple of 4 Mark final answer. Allow an embedded answer eg $4 \times 0{\cdot}75 + 7 = 10$ for B2, but penalise −1 if contradicted by $x \neq 0{\cdot}75$
10. (Factors of) 16, OR 32, OR 64, … (Multiples of) 4	B1 B1	Accept any multiple of 16 which does not have a factor of 3.
11. 9, 13 and 14 OR 10, 13 and 15 OR 11, 13 and 16 OR 12, 13 and 17	B2	Allow in any order. B1 for 3 whole numbers with a median of 13 OR B1 for 3 whole numbers with a range of 5 Penalise -1 for any repeated numbers. e.g. 8, 13, 13 gains B2 -1 = B1 13, 13, 13 gains B1 -1 = B0.
12.  (Perimeter =) 8×7 + 2×3 (cm) or equivalent (Perimeter =) 62 (cm)	B1 M1 A1	May be implied by correct method which would lead to an answer of 62 (cm). (This is the only diagram which can gain B1.) If no diagram, then B1 M1 A1 for correct calculation which leads to answer of 62 (cm). FT these large rectangles only:  B0 (Perimeter =) 8x3 + 2x7 (cm) or equivalent M1 (Perimeter =) 38 (cm) A1 OR  B0 (Perimeter =) 4x7 + 4x3 (cm) or equivalent M1 (Perimeter =) 40 (cm) A1 If no diagram, allow SC1 for (8x3 + 2x7 or equivalent) = 38 (cm) OR (4x7 + 4x3 or equivalent) = 40 (cm).
Organisation and Communication Accuracy of writing	OC1 W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means. For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.
13.(a) 20(:)18 OR 8(:)18 p.m..	B1	B0 for (0)8:18 or 8:18 a.m. or 20:18 a.m. Allow 20(:)18 p.m. and 08:18 p.m.

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

13.(a) 	B2	B1 for each individual shape. Ignore clearly deleted shading. .
13.(b) Reflection (in the line) x = 5	B2	B1 for stating 'Reflection'. Ignore extra wording once 'reflection' (or 'reflected') seen. B1 for stating x = 5 (simply drawing the line is B0)
14.(a) 10x + 15 = 20 OR 2x + 3 = 4 10x = 5 OR 2x = 1 x = $\frac{5}{10}$ OR x = $\frac{1}{2}$ or equivalent	B1 B1 B1	FT until 2nd error. Mark final answer. Allow an embedded answer but penalise −1 if contradicted by x ≠ ½ or 0·5.
14.(b) $5(n-3)$ or $5\times(n-3)$ or $(n-3)5$ or $(n-3)\times 5$ or $5n-15$	B2	B1 for sight of $n-3\times 5$ OR sight of $5\times n-3$. B0 for unsupported $n-15$ OR unsupported $5n-3$. Allow 'n = 5(n – 3)' etc Mark final answer.
15.(a) YES AND a valid explanation. e.g. ' the other two angles would be (both) 20(°)' e.g. diagram showing (isosceles) triangle with angles of 140°, 20° and 20°.	E1	A valid explanation implies YES circled if not otherwise contradicted (by circling NO). Explanations must engage with the specific triangle given (with an angle of 140°) and not isosceles triangles in general.
15.(b) a + b = 150	B1	
16. [n(G ∩ S) =] 10 [n(S) =] 13	 B1 B1	Entries must be a whole numbers. [n(Ɛ)] must be 30 (i.e. no additional 'non-Spanish'). Any blank space to be taken as 0.
17. (Length of AD or BC =) 10 (cm)	B1	May be seen on the diagram or implied in later work.
(Area of ABCD = 5 × 10 =) 50 (cm^2)	B1	FT 5 × 'their AD (or BC)'. The 50(cm^2) may be shown as two areas of 25(cm^2) for B1 B1.
(Area APB =) $\frac{\pi\times 5^2}{4}$	M1	
$= 19{\cdot}6(.....)(cm^2)$	A1	SC1 for sight of $\pi\times 5^2$ or equivalent (78·5….)
(Shaded area = 50 − 19·6 =) 30·3(…) or 30·4(cm^2)	B1	FT 'their stated area ABCD' – 'their stated area APB' *Note: Sight of (25 – 'area of APB') + 25 implies the first two B marks. [rectangle divided in half]*

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

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

19.(a) Correct <u>construction</u> method. e.g. (i) intersecting arcs of radii 6cm and 9cm with centres A and C respectively. OR (ii) copying the angle at B at the point A (will require AB or BA to be extended). Completed parallelogram.	M1 A1	Relevant construction arcs must be seen.
19.(b) 'measured length' × 200 = 1520 (cm) = 15·2 metres	M1 A1 B1	Allow for error in measuring line XY. Accept only in range 1480 to 1560 inclusive. FT 'their 1520' ÷ 100. Unsupported 14·8 to 15·6 inclusive gains all 3 marks.
<u>Alternative method</u> *Sight of scale is 1cm represents 2m* *'measured length' × 2* *= 15·2 metres*	*B1* *M1* *A1*	*Allow for error in measuring line XY.* *Accept only in range 14.8 to 15.6 inclusive.*
20.(a) 9·231	B1	
20.(b) 170	B1	
20.(c) 10	B1	

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 ÷ 7 must be rounded or truncated to at least 2dp. e.g. 7x = 8 (B0) followed by, x = 8 ÷ 7 (B0) x = 8/7 (B1), x = $1^{1}/_{7}$ (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 ≠ 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 × 440 × n where 320 ≤ n ≤ 330. Correct evaluation. (To the nearest ten million) 30 000 000 (paper clips)	M2 A1 B1	M1 for 200 × n OR 440 × n where 320 ≤ n ≤ 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.* 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.) 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. 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.*

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

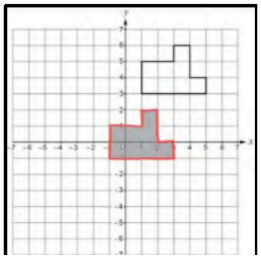
13. $5x - 17 + 2x + 9 + x + 20 = 180$ $8x = 168$ $x = 21$ Substituting x = 21 into at least one expression. $(5x - 17 =)\ 88(°)\ \ (2x + 9 =)\ 51(°)\ \ (x + 20 =)\ 41(°)$ (So not a right-angled triangle)	M1 A1 A1 M1 A1	 F.T. from ax = b. Allow all 3 marks for x = 21. If $x \neq 21$ FT 'their <u>derived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

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

14. (a) Square spinner Triangular Spinner 1: 2 (4) 6 (8) 3: (6) 12 (18) (24) 5: 10 (20) 30 40	B1	All six entries correct.
14. (b) Valid explanation given e.g. "odd × even = even" "because it's odd times even" "even times any whole number is always even"	E1	Do not accept "because all the numbers on the square spinner are even" Allow "as they are multiplied by even numbers which make even numbers" "because it's multiplied with an even number"
14. (c) $\frac{7}{12}$ ISW	B2	FT 'their fully completed table'. Award B2 for unsupported 58·3(333…)%. Penalise −1 for only words (7 out of 12) or only ratio (7:12). B1 for $x/12$ if $x < 12$. B1 for $7/y$ if $y > 7$ (FT 'their 7'). B1 for unsupported 58%.
14. (d) (Amount taken = 228 × £2.50 =) (£)570	B1	
(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 228 × 'their 7/12' provided less than 1 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 prize money = 133 × £3.50 =) (£)465.5(0)	B1	FT £3.50 ×'their 133' (provided < 228).
(Expected profit = 228 × £2.50 – 133 × £3.50 =) (£)104.5(0)	B1	(£)570 – (£)465.5(0) FT 'their (£)570' – 'their (£)465.5(0)' Award B1B1B1B0 for sight of 228 × £2.50 – 133 × £3.50 with an incorrect final answer. If the FT results in a loss, the 'Loss' must be stated, or the answer left as a negative.

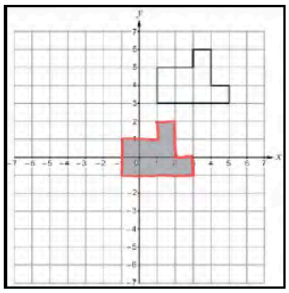
(Expected number of winners = 7/12 × 228) *133 (winners)*	*B1*	*If 7/12 or correct % or decimal seen in part (c), it must be used for this B1.* *FT 'their 7/12' if less than 1 × 228* *Allow 133/228 or '133 out of 228'* *Must be whole number* *Award B0 for* *7/12 × 228 = 0·58(333…) × 228 = 132 winners.* *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.*
14. (d) <u>Alternative Method 2</u> *Working with 12 players* *(Amount taken = 12 × £2.50 =)* *(£)30(.00)*	*B1*	
(Expected prize money = 7 × £3.50 =) *(£)24.5(0)*	*B1*	*FT 'their 7' (provided < 12)*
(Expected profit for 12 players = *(£)30(.00) - (£)24.5(0) =)* *(£)5.5(0)*	*B1*	*FT 'their (£)30(.00)' – 'their (£)24.5(0)'*
(Expected profit for 228 players *= <u>228</u> × (£)5.5(0) =)* *(£)104.5(0)* *12*	*B1*	*FT 19 × 'their (£)5.5(0)'* *If the FT results in a loss, the 'Loss' must be stated, or the answer left as a negative.*

15. (a) (CE =) $8 \times \frac{15}{10}$ or $8 \div \frac{10}{15}$ = 12 (cm)	M1 A1	Or equivalent M1 for correct use of linear ratio.
15.(b) (AB =) $10{\cdot}5 \times \frac{10}{15}$ or $10{\cdot}5 \div \frac{15}{10}$ or equivalent = 7 (cm)	M1 A1	Or equivalent M1 for correct use of linear ratio. FT 'their scale factor' from (a) provided not 1.

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

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

9.(a) Position of *C* 300° from *B* Position of *C* 7cm from *B*	B1 B1	Allow tolerance of ±2°. Allow any unambiguous indication that the correct bearing has been drawn (e.g. dot, cross). Allow tolerance of ±2 mm.
9.(b) (AC =) 53 (km) Bearing = 018°	B1 B1	**Strict** FT 'their AC' × 5, with tolerance of ±1 km. **Strict** FT from their diagram. Must be a three-figure bearing. Allow tolerance of ±2°

		• blue and red being equal to each other.
11.(a) Correct enlargement	B2	Allow correct enlargement in any orientation. B1 for three adjacent sides correctly enlarged in the same orientation. SC1 for an enlargement by a factor of 2 or 4.
11.(b) Correct translation. 	B1	Do not award B1 for sight of a correct translation with other shapes on the grid.

14.(a) $3y \times (y + a)$ or $3y^2 + 3ay$ or equivalent $(a =)$ 4	B1 B2	Award B1 for intention of width × length. Allow $3y \times y + a$ for B1. Award B1 for one of the following: • $3y^2 + 3ay = 3y^2 + 12y$ • $3a = 12$ • $3ay = 12y$. Award B1B2 for unsupported answer of $(a =)$ 4. Allow B1B2 for a correct embedded answer BUT only B1B1 if contradicted by $a \neq 4$ or equivalent.
14.(a) *Alternative Method* (Area =) $3y\ (y + 4)$ $(a =)\ 4$	*B2* *B1*	*Accept $3y(1y + 4)$.* *Award B1 for one of the following:* • $3y(y \pm \ldots..)$ • $3y(\ldots.. + 4)$ • $3(y^2 + 4y)$ • $y(3y + 12)$ *CAO*
14.(b) (i) Valid written explanation referring to negative values **representing sides** e.g. " $(4 \times 2 - 10 = -2)$ you can't have a negative value for a side" "x must be greater than 2·5 to have a positive value for the side"	E1	Allow "you can't have a negative length". Do not allow • calculations only • "it can't be negative" • "the value can't be negative".
14.(b)(ii) $14x - 4 - 2 \times (4x - 10)$ OR $14x - 4 - 8x + 20$ or equivalent (sum of both lengths=) $6x + 16$ (length=) $3x + 8$	M2 A1 B1	May be seen on diagram. Award M1 for intention for a method e.g. $4x - 10 + 4x - 10 + ? = 14x - 4$ e.g. $14x - 4 = ? + 2 \times (4x - 10)$ e.g. incorrect use of brackets but a clear attempt at the correct calculation is seen: $14x - 4 - 8x - 20$. FT from M1: $14x - 4 -$ 'their $2 \times [4x - 10]$' or equivalent, provided 'their $8x - 20$' can be expressed in the form $ax + b$, with a & b ≠ 0. Note: $14x - 4 - 8x - 20 = 6x - 24$ is awarded M1A1. May be seen on diagram. Mark final answer. FT 'their $6x + 16$' ÷ 2, provided in the form $ax + b$, with a & $b \neq 0$. Unsupported $3x + 8$ is awarded M2 A1 B1. If no marks awarded, award SC1 for a final answer of: • $3x + c$ ($c \neq 8$) • $kx + 8$ ($k \neq 3$ and positive).

16.(a) $7p = 63$ $p = 9$	B1 B1	FT from $7p = k$. Unsupported answer of 9 is awarded B1B1. p = 63/7 is awarded B1B0. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction (e.g. if $7p = 60$, then p = 60/7 is awarded B0B1, but p = 60÷7 is awarded B0B0) Allow B1B1 for a correct embedded answer BUT only B1B0 if contradicted by $p \neq 9$. Mark final answer.
16. *(b)* $4a - 15b$	B2	Must be an expression for B2. Award B1 for one of the following: • sight of $(+)4a$ • sight of $-15b$ • $4a + -15b$. Mark final answer.

16. For a correct method that produces 2 prime factors from the set {3, 3, 5, 5, 7} before the 2nd error.	M1	Must be a method that involves only division.
3, 3, 5, 5, 7	A1	CAO for sight of the five correct factors (Ignore 1s)
$3^2 \times 5^2 \times 7$	B1	Do not FT non-primes. FT 'their primes' provided at least one index form used with at least a square. Allow $(3^2)(5^2)(7)$ and $3^2.5^2.7$ Do not allow $3^2,5^2,7$. Inclusion of 1 as a factor gets B0.

17.(a) Position of *C* 300° from *B*	B1	Allow tolerance of ±2°. Allow any unambiguous indication that the correct bearing has been drawn (e.g. dot, cross).
Position of *C* 7cm from *B*	B1	Allow tolerance of ±2 mm.
17.(b) (AC =) 53 (km)	B1	**Strict** FT 'their AC' × 5, with tolerance of ±1 km.
Bearing = 018°	B1	**Strict** FT from their diagram. Must be a three-figure bearing. Allow tolerance of ±2°

8. (Volume of cuboid = $4 \times 5 \times 20$ =) 400 (cm^3)	B1	Award B0 if 400 has come from incorrect working or if subsequent working is seen (e.g. finding the total surface area or $4 \times 5 \times 20 = 400$, $400 \times 2 = 800$).
(Volume of cube = $3 \times 3 \times 3$ =) 27 (cm^3)	B1	
(Number of cubes =) $\frac{4 \times 5 \times 20}{3 \times 3 \times 3}$ or equivalent	M1	FT 'their 400' ÷ 'their 27', provided 'their 27' ≠ 3 and that **B1 has previously been awarded or $4 \times 5 \times 20$ and $3 \times 3 \times 3$ seen.**
= 14·8(.....)	A1	May be implied in the final answer.
(Number of complete cubes =) 14	B1	FT only if truncation required. If $\frac{4 \times 5 \times 20}{3 \times 3 \times 3}$ = 14 (complete cubes) is seen, then award B1 B1 M1 A1 B1.
8. 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

13.(a) $3x = 27$ $(x =)\ 9$	 B1 B1	Mark final answer. FT from $3x = k$. Unsupported answer of 9 is awarded B1B1. $x = \frac{27}{3}$ is awarded B1B0. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction (e.g. if $3x = 7$, then $x = \frac{7}{3}$ is awarded B0B1, but x = 7÷3 is awarded B0B0). Allow B1B1 for a correct embedded answer BUT B1B0 if contradicted by $x \neq 9$.

13.(b)	$8f-13g$	B2	Mark final answer. Must be an expression for B2. Award B1 for one of the following: • sight of $(+)8f$ • sight of $-13g$ (do not allow …..$-\,-13g$) • $8f\ +-13g$.

13.(a)(i) m^7	B1	
13.(a)(ii) m^{10}	B1	
13.(b) $7n-3$	B2	Mark final answer. B1 for sight of $7n$. Allow notation of $n7$ or $7\times n$ or $n\times 7$ for $7n$. Allow N for n, but penalise –1 for use of a different letter.

13.(c)	7, 8 and 9	B2	Answer line takes precedence. Award B2 for all three integers and no extras. Award B1 for one of the following indicated as a final answer: • 7, 8, 9 and only **one** other incorrect value • for two correct with no incorrect value • 7 to 9 • 7, 7·5, 8, 8·5, 9 • sight of $6.5 < n < 9.5$ or equivalent • 14,16,18 • 14,15,16,17,18. Allow B2 for correct embedded answers of 7, 8 and 9 (e.g. sight of only $2 \times 7 = 14$, $2 \times 8 = 16$, $2 \times 9 = 18$ with no other calculations) BUT only B1 if contradicted on answer line (e.g. 14, 16, 18 for the example above).

14.(a)	−2 (+)4	B2	Award B1 for one of the following: • −2 • 'their −2' + 6 evaluated correctly provided 'their −2' is negative.
14.(b)	0·7 or equivalent	B2	Mark final answer. Award B2 for unsupported 0·7 or not from incorrect working. Award B1 for one of the following: • sight of (+)27·9 (not (+)27·9g and not −27·9(g)) • sight of −27·2 (not −27·2h) • 0·7 (with additional letters) • a final answer of 55·1 (27·9 implied).

14.(a)	1·2	B2	Mark final answer. Award B1 for one of the following: • sight of 1·1(5519…..). • an answer of 1·20. Do not award B2 or B1 for answers obtained from incorrect work (e.g. rounding and/or estimating).
14.(b)	0·043	B2	Mark final answer. Award B1 for sight of one of the following: • $\frac{1}{23}$ • 1 ÷ 23 • 0·0434(…) • 0·0435 • 0·04.
14.(c)(i)	12	B1	
14.(c)(ii)	5	B1	

17. (Volume of cuboid = $4 \times 5 \times 20$ =) 400 (cm^3)	B1	Award B0 if 400 has come from incorrect working or if subsequent working is seen (e.g. finding the total surface area or $4 \times 5 \times 20 = 400$, $400 \times 2 = 800$).
(Volume of cube = $3 \times 3 \times 3$ =) 27 (cm^3)	B1	
(Number of cubes =) $\frac{4 \times 5 \times 20}{3 \times 3 \times 3}$ or equivalent	M1	FT 'their 400' ÷ 'their 27', provided 'their 27' ≠ 3 and that **B1 has previously been awarded or $4 \times 5 \times 20$ and $3 \times 3 \times 3$ seen.**
= 14·8(.....)	A1	May be implied in the final answer.
(Number of complete cubes =) 14	B1	FT only if truncation required. If $\frac{4 \times 5 \times 20}{3 \times 3 \times 3}$ = 14 (complete cubes) is seen, then award B1 B1 M1 A1 B1.

5(a) 209° ± 2°	B1	Answer space takes precedence
5(b)(i) Answer in the range 21 (km) to 25 (km)	B1	Answer space takes precedence
5(b)(ii) Correct interpretation of the map scale, e.g. • 1 cm represents 25 000 cm or 250 m • 2 cm represents 50 000 cm or 500 m or 0.5 km • 4 cm represents 100 000 cm or 1 000 m or 1 km OR Correct conversion 12 km to cm, 25 000 cm to km or equivalent, e.g. • (12 km =) 1 200 000 (cm) • (25 000 cm =) 0.25 (km) • sight of 1200 and 25 • sight of 12 and 0.25 12 ÷ 0.25 or 12 × 4 or 1 200 000 ÷ 25 000 or 1 200 ÷ 25 or equivalent 48 (cm)	B1 M1 A1	 Ignore place value error, e.g. 12 ÷ 'their number with digits 25', 12 × 'their number with digit 4' CAO
5(b)(ii) Alternative method *(Original map scale is 3 cm : 12 km =)* *3 : 1 200 000 or 1 : 400 000 or equivalent* $\frac{400\,000}{25\,000}$ × 3 or 16 × 3 or equivalent *48 (cm)*	*B1* *M1* *A1*	 *Ignore errors in place value* *CAO*

9(a) 209° ± 2°	B1	Answer space takes precedence
9(b)(i) Answer in the range 21 (km) to 25 (km)	B1	Answer space takes precedence
9(b)(ii) Correct interpretation of the map scale, e.g. • 1 cm represents 25 000 cm or 250 m • 2 cm represents 50 000 cm or 500 m or 0.5 km • 4 cm represents 100 000 cm or 1 000 m or 1 km OR Correct conversion 12 km to cm, 25 000 cm to km or equivalent, e.g. • (12 km =) 1 200 000 (cm) • (25 000 cm =) 0.25 (km) • sight of 1200 and 25 • sight of 12 and 0.25 12 ÷ 0.25 or 12 × 4 or 1 200 000 ÷ 25 000 or 1 200 ÷ 25 or equivalent 48 (cm)	B1 M1 A1	 Ignore place value error, e.g. 12 ÷ 'their number with digits 25', 12 × 'their number with digit 4' CAO
9(b)(ii) Alternative method *(Original map scale is 3 cm : 12 km =)* *3 : 1 200 000 or 1 : 400 000 or equivalent* $\frac{400\,000}{25\,000}$ × 3 or 16 × 3 or equivalent *48 (cm)*	*B1* *M1* *A1*	 *Ignore errors in place value* *CAO*

11. (Width of poster) $2 \times \frac{26.4}{2.4}$ or 2×11 or equivalent	M1	
22 (cm)	A1	Mark final answer for the width of the poster
(Perimeter of poster $2 \times (22 + 26.4)$ =) 96.8 (cm)	A1	FT 'their 22' provided M1 previously awarded
100 (cm)	B1	FT provided 95 < 'their 96.8' <100, as 100 correct to 1 significant figure Accept working in mm or m, units must then be given in the final answer Do not accept an unsupported answer of 100 (cm)
11. Alternative method *(Perimeter of stamp) 8.8 (cm)* ***AND*** *sight of* $\frac{26.4}{2.4}$ *(= 11) or* $\frac{2.4}{26.4}$ $(= \frac{1}{11})$	*B1*	
(Perimeter of poster) *(2 + 2.4 + 2 + 2.4)* $\times \frac{26.4}{2.4}$ *or 8.8* $\times \frac{26.4}{2.4}$ *or 8.8 × 11 or equivalent*	*M1*	*FT 'their 2 + 2.4 + 2 + 2.4'*
96.8 (cm)	*A1*	
100 (cm)	*B1*	*FT provided 95 < 'their 96.8' <100, as 100 correct to 1 significant figure* *Accept working in mm or m, units must then be given in the final answer* *Do not accept an unsupported answer of 100 (cm)*

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

2		
13. 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).

14.(a) $9{\cdot}17 \div 7 \times 3$ or equivalent 3·93 (km) 3930 (m)	 M1 A1 B1	Answer space takes precendence. May be seen in stages. FT 'their 3·93' × 1000.
14.(a) Alternative method (converting to m first) *9170 (m)* *9170 ÷ 7 × 3 or equivalent* *3930 (m)*	 *B1* *M1* *A1*	*Answer space takes precedence.* *FT 'their 9170' ÷ 7× 3 provided that the digits 917 are seen (i.e place value error).*
14.(b) $\frac{25}{2 \times 60 + 5}$ (× 100%) or equivalent = 20 (%)	M2 A1	Allow 0·2 or $\frac{1}{125 \div 25}$ or $\frac{1}{5}$ to imply M2. Award M1 for an attempt at $\frac{25}{2\ hours\ 5\ minutes}$ but with incorrect denominator (e.g. 2·5, 2·05, 2 hours 5 minutes stated incorrectly with 2 × 60 + 5 not shown). CAO Mark final answer. If no marks awarded, award SC1 for sight of 125 (minutes).
14(b). Alternative Method *125 minutes = (100%)* *12·5 minutes = 10%* *25 minutes = 20%*	 *B1* *M1* *A1*	 *CAO* *Mark final answer.*

14.(a)	£285 × $0{\cdot}96^3$	B1	
14.(b)	$\frac{34.2}{90} \times 100$ OR $\frac{34.2}{0.9}$ or equivalent	M1	Accept a **complete** and **convincing** method of trial and improvement.
	= 38	A1	Award M1A1 for an embedded answer (e.g. 0·9 × 38 = 34·2 or $\frac{34.2}{38} \times 100$ = 90%), BUT only M1A0 if contradicted by stating original amount ≠ 38. Unsupported 38 is awarded M1A1.

Unit 2: Intermediate Tier		Mark	Comments
1.(a)	$x = 100$	B1	Mark final answer. Allow B1 for a correct embedded answer BUT B0 if contradicted by $x \neq 100$.
1.(b)	$7m = 28$ $m = 4$	B1 B1	FT from $7m = k$. Unsupported answer of 4 is awarded B1B1. $m = \frac{28}{7}$ is awarded B1B0. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction or decimal (e.g. if $7m = 34$, then $m = \frac{34}{7}$ is awarded B0B1, but m = 34÷7 is awarded B0B0). Allow B1B1 for a correct embedded answer BUT only B1B0 if contradicted by $m \neq 4$.

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

6. (Tax on first 15000 euros) 0.2(0) × 15000 (Tax on remaining income) 0.3(0) × (26000 – 15000) (Total income tax) (euros) 6300	M1 M2 A2	Ignore £ written for euros (= 3000 euros) (= 3300 euros) M1 for (Remaining income to be taxed) 26000 – 15000 (= 11000 euros) Ignore any further working (such as to calculate income – income tax) A1 for either part of the tax correctly evaluated, i.e. (0.2(0) × 15000 =) 3000 (euros) or (0.3(0) × (26000 – 15000) =) 3300 (euros)

7(a) B and H in either order	B2	B1 for either B or H selected
7(b)(i) $\frac{42-30}{30}$ (× 100) or $\frac{42}{30}$ (× 100) – 1 (× 100) 40 (%)	M1 A1	Or full reverse method, e.g. • 20% of £30 is 30 ÷ 5 = £6, with either 6 × 2 = (£)12 or 6 × 7 = (£)42 • 10% of £30 is 30 ÷ 10 = £3, with either 3 × 4 = (£)12 or 3 × 14 = (£)42 Allow an answer of £40 from correct working If no marks, award SC1 for an answer of 140(%)
7(b)(ii) (Percentage profit is) $\frac{9\times42-10\times30}{10\times30}$ (× 100) or $\frac{9\times12-30}{10\times30}$ (× 100) or $\frac{9\times42}{10\times30}$ (× 100) – 1 (× 100) or $\frac{378}{300}$ (× 100) – 1 (× 100) or 1.26 (× 100) – 1 (× 100) or equivalent 26 (%) **AND** states 'profit'	M2 A2	Allow a reverse method of finding percentages of 300 used, these percentages must be correct and when added (or subtracted) could lead to an answer of 26% e.g. (2 × 10% =) 20% of 300 is 60 and 6% of 300 is 18 M1 for any one of the following: • (difference between sales and costs) 9 × 42 – 10 × 30 (= 378 – 300) • (sales) (£) 378 AND (cost) (£) 300 • (difference between sales and costs) (£) 78 Mark final answer A1 for any one of the following: • 26(%) • $\frac{78}{300}$ (× 100) or equivalent • $\frac{378}{300}$ × 100 = 126 (%) • $\frac{378}{300}$ = 1.26 • ('their $\frac{9\times42' - 10\times30}{10\times30}$') × 100 correctly evaluated and given as a percentage, allow if an error in the decimal part of their answer
7(b)(iii) 8	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)	$x = 100$	B1	Mark final answer. Allow B1 for a correct embedded answer BUT B0 if contradicted by $x \neq 100$.
9.(b)	$7m = 28$ $m = 4$	B1 B1	FT from $7m = k$. Unsupported answer of 4 is awarded B1B1. $m = \frac{28}{7}$ is awarded B1B0. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction or decimal (e.g. if $7m = 34$, then $m = \frac{34}{7}$ is awarded B0B1, but m = 34÷7 is awarded B0B0). Allow B1B1 for a correct embedded answer BUT only B1B0 if contradicted by $m \neq 4$.

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

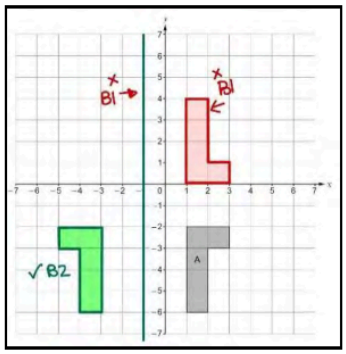
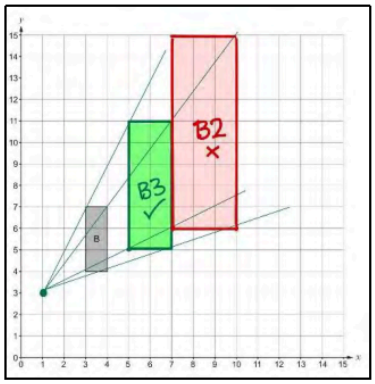
11.(a) Accurate drawing of triangle *ABC*.	B2	Award B1 for one of the following: • *AC* = 8 cm • *BC* = 6·5 cm • triangle with *AC* = 6·5 cm and *BC* = 8 cm • sight of 8 cm AND 6·5 cm.
11.(b) 111(°)	B1	**Strict FT** from their drawing.

13.(a) 0·5 kg	B1	
13.(b) 24 km	B1	

13.(a)	4	B1	Answer in table takes precedence.
13.(b)	At least 6 correct plots and no incorrect plot	P1	FT 'their (1,4)'. Allow ± '½ a small square'. Ignore any additional points plotted on the curve.
	A smooth curve drawn through their plots	C1	FT 'their 7 plots' OR a curve through the 6 given points **AND** (1,4). Allow intention to pass through their plots (± '1 small square horizontally **or** vertically)'.

13.(c) −3·7 AND 1·2	B2	Answer line takes precedence. May be seen in any order. Allow ± '1 small square' i.e. ± 0.1. FT intersection of 'their curve' with $y = 6$ only if exactly two points of intersection. Award B1 for one of the following: • line $y = 6$ drawn (must be at least 5 small squares long) • −3·7 • 1·2 • one correct intersection of 'their curve' with $y = 6$ • two correct intersections of 'their curve' with 'their $y = 6$' only if exactly two points of intersection.

Unit 1: Intermediate Tier	Mark	Comments
14. (LCM of 10 and 18 =) 90 or equivalent, e.g. $2 \times 3 \times 3 \times 5$ or $2 \times 9 \times 5$	B2	B1 for any other common multiple identified e.g. 180, 270 etc.
(HCF of 30 and 72 =) 6 or equivalent, e.g. 2×3	B2	B1 for any other common factor identified i.e. 2, 3, . Do not accept 1.
$n = 15$	B1	B2 B2 B0 for 90/6. FT only if at least one B2 gained. If at least one B2 awarded for correct products seen but incorrectly evaluated LCM or HCF, then B0 is awarded as the final mark. e.g. award B2 B2 B0 for $2 \times 3 \times 3 \times 5 = 90$ and $2 \times 3 = 5$, $n = 90/5 = 18$ award B1 B2 B0 for LCM = 180 and $2 \times 3 = 5$, $n = 180/5 = 36$. Accept an answer rounded, truncated, or as an improper fraction if n is not an integer. If no marks awarded, award one of the following: • SC2 for a final answer of $\frac{2}{360}$ or $\frac{1}{180}$ equivalent (from reversing LCM and HCF) • SC2 for a final answer of $\frac{6}{90}$ or $\frac{1}{15}$ equivalent (answers reversed). • SC1 for sight of LCM = 2 **AND** HCF = 360 (from reversing LCM and HCF). An unsupported 15 is awarded B2B2B1.

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

3(a)(i) 45 (years)	B1	
3(a)(ii) 2.06 (metres)	B1	Do not accept 2m 6cm
3(a) (iii) three million (and) one hundred (and) forty-two thousand (dollars)	B1	Ignore spelling and the units given
3(b) Sphere	B1	

3(c) 15 (metres)	B3	Answer space takes precedence Answers and/or workings may be seen on the diagram For B3, allow answers in the inclusive range 14.4 (metres) to 15.6 (metres) Award B2 for any one of the following: • Scale factor of 2 • Scale factor of ½ • (×) 2 • (×) 200 • (28 ÷ 14 =) 2 • 28 ÷ 2 = 14 (embedded scale factor of 2) • 14 × 2 = 28 (embedded scale factor of 2) • Implied scale factor of 2 e.g. double 'their 7.5' • 1(cm) is 2(m) or equivalent Do not award B2 if 28 × 2 = 56 alone is seen as this does not indicate a scale factor of 2 Award B1 for any one of the following: • One correct measurement seen or implied. • 7.5 (cm) ± 2 mm • 14 (cm) ± 2 mm • Allow 7.5 m • Allow 14 m
3(d)(i) No and a valid reason e.g. 'No, because the angle is more than 90(°)' 'No, as the angle is bigger than a right angle' No, acute is less than 90 (°)' 'No, angle is obtuse' 'No, it's obtuse'	E1	Reasons may be indicated on the diagram. Allow 'No, angle is too big to be an acute angle' 'No, angle is larger than an acute angle' No, angle is greater than an acute angle' 'No, an acute angle is smaller', Do not allow 'No, because an acute angle is 70(°)' 'No, because it's not an acute angle' 'No because an acute angle is not 157'
3(d)(ii) Correct line drawn from Bryn	B2	Use of overlay Award B1 for either • 157° (± 2°) drawn at Bryn • 7cm (± 2mm) line drawn from Bryn No marks awarded for a line drawn at Alex

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 • $\frac{1\,000\,000}{52\,000}$ • $\frac{1\,000\,000}{50\,000}$ • $\frac{1000}{50}$ • $\frac{1000}{52}$

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) <u>Alternative method</u> *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 <u>and</u>
		  • 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)

13.(b)(i) 27 : 30 9 : 10	 B1 B1	Answer line takes precedence. Must be in a ratio for B1. Award B1 for one of the following: • simplifying 27 : 'their 30' correctly evaluated • an answer of 7 : 8 (from 21 : 24) • 10 : 9 (unsupported or from 30 : 27). Award B1 B1 for an unsupported answer of 9 : 10.
13.(b)(ii) Valid explanation e.g. "they are not the same age" "Andrew is younger (so they can't be the same)" "Richard is older (so they can't be the same)" "Richard is 3 years older" "They'll always be different" "(there's a) difference in their ages" "their ages are not equal" "they are 3 years apart" "1:1 means they are the same age" "there's a gap (in their ages)" "they were born different dates"	E1	Do not allow FT from 13(b)(i). Do not allow: • further spurious **incorrect** comments e.g. "they are 3 years apart, so their ratios have to add to 3" • "Andrew will always be older" • "Because Andrew is 7 years older".

13. $2x + 3(x + 6) = 78$ or equivalent	M2	Answer lines takes precedence. Brackets may be implied by later correct work. Award M1 for one of the following: • Sight of $2x + 3(x + 6)$ or equivalent • $2x + 3x + 6 = 78$ (brackets omitted or incorrect).
$5x + 18 = 78$	A1	CAO. May be implied in later working.
$5x = 60$	A1	FT from M2 or M1, 'their $5x + 18 = 78$'.
$(x) = 12$	A1	FT from M2 or M1, 'their $5x = 60$'.
12 and 18	B1	FT 'their algebraically derived 12' and 'their 12 + 6' correctly evaluated. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. If M2 is awarded as the first step (forming an equation), then award the following A1A1A1B1 for 12 and 18 clearly identified as final answers (even if trial and improvement is then used).