

REVISE

.wales

F2.15 – Angle facts – points, lines, triangles & quadrilaterals

Mark schemes for the F2.15 question pack

Spec 3.4.1, 3.4.2 – Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 73 questions in the corresponding revise.wales question pack (162 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

4. (a)	obtuse		B1	
4 (b)	cuboid		B1	

16. $\frac{QR}{18} = \tan 24^\circ$ $QR = 18 \times \tan 24^\circ$ $= 8.01 \dots (\text{cm})$	M1 m1 A1 2	OR $\frac{QR}{\sin 24} = \frac{18}{\sin 66}$ $QR = \frac{18 \times \sin 24}{\sin 66}$ C.A.O.
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<p>19.</p> <p>(Angle DOC or exterior angle =) $\frac{360(^\circ)}{5}$</p> <p style="padding-left: 150px;">$= 72(^\circ)$</p> <p style="padding-left: 100px;">$(x =) \frac{180 - 72}{2}$</p> <p style="padding-left: 150px;">$= 54(^\circ)$</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>1/6 to be 0.16 or 0.17 or 0.166.</p> <p><i>Answers/working may be seen on diagram.</i></p> <p>Sight of 72 (even $x = 72$) gains M1A1.</p> <p>FT 'their 72' (but not 60°).</p> <p><i>Alternative method</i></p> <p><i>(Sum of interior angles =)</i></p> <p><i>$(5 - 2) \times 180^\circ$ or equivalent</i> M1</p> <p><i>$= 540(^\circ)$</i> A1</p> <p><i>FT 'their interior angle sum' ($\neq 900$)</i></p> <p><i>$(x =) \frac{1}{2} \times (540 \div 5)$</i> M1</p> <p><i>$= 54(^\circ)$</i> A1</p>
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Unit 1: Foundation Tier Summer 2018		
1.(a) 11.5 (cm)	B1	Accept 11.3 - 11.7 (cm)
1.(b) circle with radius 6 cm	B1	
1.(c) 134 (°)	B1	Accept 132 – 136 (°)

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

8.(a)	180°	B1	Check diagram. Answer line takes precedence.
8.(b)	$(y=) 180 - 29 - 96$ or $360 - 180 - 29 - 96$ $= 55^\circ$	M1 A1	FT their 180 from (a) C A O

12.(a)	48°	B1	
12.(b)	East	B1	
12.(c)	200°	B1	

16.(a) $a + c + s + q = 360^\circ$	B1	SC1 for a 13/50 if no marks gained.
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5.(a) Lines Curve	L1 C1	For all 3 straight lines. F.T. their lines, must have opposite curvature, starting at the correct place and ending at the start of their line.
5.(b) Rectangle	B1	
5.(c) Cylinder	B1	

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

<p>17.(a) 0.92 written on the 'Not a Saturday' branch. Sight of $1 - 0.15 - 0.45$ OR 0.4 or 0.40 $0.4(0)$ <u>on</u> both 'car' branches AND 0.15 AND 0.45 correctly shown <u>on</u> lower branches.</p>	<p>B1 B1 B1</p>	<p>Allow this B1 if shown on working lines.</p>
<p>17.(b) Sight of 0.08×0.15 OR 0.08×0.4 or equivalent. $(P(\text{Sat and 'plane or car')}) = 0.08 \times 0.15 + 0.08 \times 0.4$ or equivalent $= 0.044$ or equivalent. ISW</p>	<p>B1 M1 A1</p>	<p>FT 'their P(car)' if <1. 0.08×0.55 implies previous B1.</p>
<p><u>Alternative method</u> $(P(\text{Sat and 'plane or car')}) = 1 - (0.92 + 0.08 \times 0.45)$ or equivalent $= 0.044$ or equivalent. ISW</p>	<p>M2 A1</p>	<p>FT 'their 0.92'. M1 for intent $P(\text{Sat and 'plane or car'}) = 1 - P(\text{'not Saturday'}) - P(\text{'Saturday and train'})$</p>

20.	$(-3, 5)$	B1	
21.(a)	$a = 52^\circ$ $b = 52^\circ$ $c = 64^\circ$	B1 B1 B1	OR F.T. $b =$ 'their a '.
21.(b)	$x = 64^\circ$ $y = 64^\circ$ Isosceles	B1 B1 B1	OR F.T. $x =$ 'their c '. OR F.T. $y = 180 - 52 -$ 'their x '. OR F.T. $y = 180 - 64 -$ 'their a '. OR F.T. $y = 180 -$ 'their a ' - 'their c '. OR F.T. $y = 180 -$ 'their b ' - 'their c '. CAO Dependent on values given to <u>both</u> x and y AND two equal angles in triangle LMN AND $x + y = 128$.

WJEC GCSE MATHEMATICS (NEW)

SUMMER 2019 MARK SCHEME

GCSE MATHEMATICS Unit 2: Foundation Tier	Mark	Comments
1. (£)5.84 (£)1.45 (£)4.67 (£)7.08	B1 B1 B1 B1	
2.(a) Pentagon	B1	
2.(b) Rhombus	B1	Allow equilateral kite, but not kite or parallelogram.
2.(c) Cylinder	B1	Allow circular prism.
3.(a) (47,) 94, 141	B1	Ignore additional multiples.
3.(b) 52	B1	
3.(c) 209	B1	
4.(a) Midpoint unambiguously indicated	B1	Allow +/- 2 mm.
4.(b) Unambiguous parallel line drawn through C	B1	Allow +/- 2°.
5.(a) 9 (and) 16	B2	Allow 3 ² (and) 4 ² . B1 for a sum of two square numbers less than 30 seen in workings or two square numbers less than 30 written on the answer line.
5.(b) Accept suitable explanations, e.g. <ul style="list-style-type: none"> the sum of three even numbers will be even (and 23 is odd) when you add any amount of even numbers the answer is always even (whilst 23 is odd). (23 is odd, but) even + even + even = even 	E1	Allow • even + even = even, • because 23 is odd.
6. FALSE TRUE FALSE TRUE	B2	For all four correct. B1 for 3 correct.
7.(a) 60 (%)	B2	B1 for equivalent fraction or decimal (0.6, 3/5, 12/20). If B2 not awarded, F.T. their fraction (except for 1/2, 1/4 and 3/4) correctly converted to a percentage for B1.
7.(b) Multiply by 4	E1	Accept other correct explanations e.g. divide (the number) by 5 then multiply by 20, double (the number) and double (it) again or divide by 1/4.
7.(c) Accept suitable explanations, e.g. <ul style="list-style-type: none"> 0.125 (is greater than) 0.1 5/40 (is greater than) 4/40 	E1	Award E1 for other correct explanations e.g. a larger denominator means each part of the whole is smaller, or for correct evaluation of 1/8 and 1/10 of a chosen number.
8.(a) 65 (°)	B1	Allow ±2°
8.(b) 225°	B1	
8.(c) (Small angle = 180 ÷ 6 =) 30(°) (Large angle = 5 × Small angle =) 150 (°)	B1 B1	Check diagram, though answer space takes precedence. F.T. 'their small angle' × 5 or 180 - 'their small angle', provided answer is less than 180°. If no marks awarded, award B1 for both correct angles given in reverse.

WJEC GCSE MATHEMATICS (NEW)

SUMMER 2019 MARK SCHEME

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1. (£)5.84 (£)1.45 (£)4.67 (£)7.08	B1 B1 B1 B1	
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4.(a) Midpoint unambiguously indicated	B1	Allow +/- 2 mm.
4.(b) Unambiguous parallel line drawn through C	B1	Allow +/- 2°.
5.(a) 9 (and) 16	B2	Allow 3 ² (and) 4 ² . B1 for a sum of two square numbers less than 30 seen in workings or two square numbers less than 30 written on the answer line.
5.(b) Accept suitable explanations, e.g. <ul style="list-style-type: none"> the sum of three even numbers will be even (and 23 is odd) when you add any amount of even numbers the answer is always even (whilst 23 is odd). (23 is odd, but) even + even + even = even 	E1	Allow • even + even = even, • because 23 is odd.
6. FALSE TRUE FALSE TRUE	B2	For all four correct. B1 for 3 correct.
7.(a) 60 (%)	B2	B1 for equivalent fraction or decimal (0.6, 3/5, 12/20). If B2 not awarded, F.T. their fraction (except for 1/2, 1/4 and 3/4) correctly converted to a percentage for B1.
7.(b) Multiply by 4	E1	Accept other correct explanations e.g. divide (the number) by 5 then multiply by 20, double (the number) and double (it) again or divide by 1/4.
7.(c) Accept suitable explanations, e.g. <ul style="list-style-type: none"> 0.125 (is greater than) 0.1 5/40 (is greater than) 4/40 	E1	Award E1 for other correct explanations e.g. a larger denominator means each part of the whole is smaller, or for correct evaluation of 1/8 and 1/10 of a chosen number.
8.(a) 65 (°)	B1	Allow ±2°
8.(b) 225°	B1	
8.(c) (Small angle = 180 ÷ 6 =) 30(°) (Large angle = 5 × Small angle =) 150 (°)	B1 B1	Check diagram, though answer space takes precedence. F.T. 'their small angle' × 5 or 180 - 'their small angle', provided answer is less than 180°. If no marks awarded, award B1 for both correct angles given in reverse.

15.(a)	0.32	B1	
15.(b)	Sample number from Anglesey on 2 nd day $= 3000 \times 0.42$ $= 1260$ (Rel.Fqu. for two days $=$) $\frac{640 + 1260}{2000 + 3000}$ $= 0.38$	M1 A1 M1 A1	Allow M1A1 for sight of 1260 e.g. 1260/3000 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 <u>not</u> 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)	2.38×10^{-2}	B2	B1 for sight of a correct answer but not in standard form. e.g. 23.8×10^{-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 ' \leq ' 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 $0.3 \times \dots = 0.24$ $P(\text{sees show}) = 0.8$ 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 MOAOAO)
18.(b)	0.7×0.2 $= 0.14$ ISW	M1 A1	FT 'their values' if both between 0 and 1.

1.(a) Correct position of B	B1	Use Overlay ± 2 mm
1.(b) 63°	B1	Accept $61^\circ - 65^\circ$

2. $f = 73(^{\circ})$ $g = 128 - 73$ $= 55(^{\circ})$	B1 M1 A1	B1 for sign of + or - or (.....) or + 70 F.T. 128 - 'their f'.
<u>Alternative method</u> $f = 73(^{\circ})$ $g = 180 - (180 - 128) - 73$ $= 55(^{\circ})$	B1 M1 A1	FT 'their f'.

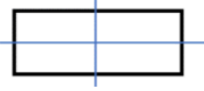
			Full (–) or B1 (Scale –) 1.00
8.(a)(i)	$(x =) 36$	B1	Accept embedded answer unless contradicted by $x \neq 36$. Mark final answer.
8.(a)(ii)	$12x + 8 = 12 \quad \text{OR} \quad 3x + 2 = 3$ $12x = 4 \quad \text{OR} \quad 3x = 1$ $x = \frac{4}{12} \quad \text{OR} \quad x = \frac{1}{3}$	B1 B1 B1	F.T. until 2 nd error. Adding 'unlike terms' eg $12x + 8 = 20x$ or $3x + 2 = 5x$ to be taken as two errors. Mark final answer. Allow 0.33(33..) A final answer of 0.3 is (B1B1)B0.
8(b)(i)	$7(2a + 3)$	B1	
8(b)(ii)	$f(f - 1)$	B1	

15.(c)	3·6	B1	
16.(a)	Correct construction of angle $PQR = 60^\circ$. Correct triangle PQR drawn,	M1 A1	Correct construction arcs must be seen and angle drawn. PQ = 7 cm (± 2 mm) and triangle drawn. Allow non labelling of point P (unless position contradicted). Ignore extension of line QP if correct triangle drawn.
16.(b)	Arc, centre A, intersecting LM at two points AND Intersecting arcs (equal radii) using the above two points as centres. Line drawn	M1 A1	[Note to markers: These arcs may be identified by the fact that they will 'cross the line LM at an acute angle'. Arcs 'crossing the line at 90° ' is evidence of an inappropriate method.]
<u>Alternative method.</u> Using the properties of a kite. Intersecting arcs whose centres are any two points on the line LM and respective radii equal in length to the distance from the points to the point A.		M1	[Note to markers: The arcs will always intersect at a point that is a 'reflection of point A' in the line LM.]

WJEC GCSE MATHEMATICS
AUTUMN 2020 MARK SCHEME

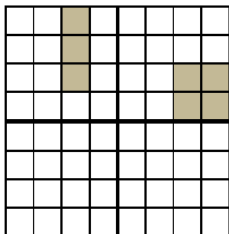
GCSE Mathematics Unit 1: Foundation Tier	Mark	Comments
1. (a) Angle of 35° drawn at A	B1	Accept 33° to 37° Point alone is not sufficient.
1.(b) Circle radius 7cm (diameter 14 cm)	B1	Accept radius 6.8 (cm) to 7.2 (cm)
2.(a) 5433	B1	
2.(b) 174	B1	
2.(c) 75	B1	
2.(d) $6 \times 7 \div 2$ = 21	M1 A1	If no 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. $\frac{1}{3} \times 180(^{\circ})$ OR $\frac{2}{3} \times 180(^{\circ})$ 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.
<u>Alternative Method</u> $2x + x = 180 (^{\circ})$ or $3x = 180 (^{\circ})$ $x = 60 (^{\circ})$ $2x = 120 (^{\circ})$	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 2: Foundation Tier	Mark	Comments
1. 1.98 53 5.88 0.41	B1 B1 B1 B1	Ignore spurious units
2.(a) 3 700 000	B1	
2.(b) 9998	B1	
2.(c) 1, 3, 5 and 15	B2	Ignore repeats. Allow 1×15 and 3×5 . B1 for 2 correct factors with none incorrect, OR for 3 or 4 correct with no more than one incorrect.
3.(a) unlikely	B1	
3.(b) 20	B1	
3.(c) Rolling a 1 on the dice	B1	
4.(a) 	B2	B1 for two correct lines with one incorrect line OR for one correct line with no incorrect lines.
4.(b) (an) equilateral (triangle)	B1	
5.(a) 102 OR 120	B1	
5.(b) 201 OR 210	B1	
6. Three different even numbers with a sum of 24, not including 8. Possible solutions are 2, 4 (and) 18 2, 6 (and) 16 2, 10 (and) 12 4, 6 (and) 14	B3	In any order. Allow inclusion of negative numbers. If B3 not awarded, award B2 for three numbers which sum to 24 which satisfy two of the three conditions: <ul style="list-style-type: none"> • The numbers are different • The numbers are even • None of the numbers is 8 If B2 not awarded, award B1 for three numbers which sum to 24.
7.(a) 0.12 or $\frac{3}{25}$ or equivalent	B1	
7.(b) $\frac{3}{5} \times 632$ or equivalent = 379.2	M1 A1	Award M1 A0 for $1896/5$ or $379\frac{1}{5}$.
7.(c) 2.5	B1	
8. $\frac{3}{10}$ 30 $\frac{9}{20}$ 0.45	B1 B1 B1 B1	Accept 30/100 for 3/10

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 2 Intermediate Tier	Mark	Comments
1.(a)(i) 16	B1	
1.(a)(ii) 2160	B2	B1 for sight of 2155(-.....) OR 2150 OR 2156. Mark final answer.
1.(b) 0.62×7.8 or equivalent. = 4.836 ISW	M1 A1	Unsupported 4.8.... implies M1. Accept $4^{209}/_{250}$ (ISW). Allow 1209/250 (ISW)
1.(c)(i) 247	B1	
1.(c)(ii) 2197	B1	
2.(a) 6 -5	B2	B1 for 6. B1 FT for correct evaluation of 'their 6' – 11 only if it leads to a negative answer.
2.(b) 15	B2	B1 for sight of 28.8 OR -13.8. Mark final answer.
3. $\frac{400}{17.5}$ or $\frac{4}{0.175}$. = 22.8(....) or 22.9 (Number of rods =) 22	M2 A1 B1	M1 if incorrect place value (in either length). Digits 228..... implies M1. C.A.O. FT if of equivalent difficulty. (i.e. 'their 22.8' must be greater than 1 AND their 1 st decimal place number greater than or equal to 5.) Answer of 22 gains all 4 marks. Unsupported answer of 23 gains M2A0B0.
3. <u>Alternative method (trial and improvement)</u> Working with a multiple of 17.5 or 0.175. ($n \times 17.5$ or $n \times 0.175$) $22 \times 17.5 (= 385)$ or $22 \times 0.175 (= 3.85)$ $23 \times 17.5 (= 402.5)$ or $23 \times 0.175 (= 4.025)$ (Number of rods =) 22	S1 B1 B1 B1	Award this S1 only if $n > 2$ and $n \neq 4$ and $n \neq 400$. This implies previous S1. This implies previous S1 and previous B1 if 402.5 seen. Must be seen in answer space or unambiguously identified (not simply embedded). Answer of 22 gains all 4 marks. Unsupported answer of 23 gains S1B0B1B0.
4.(a) All labels correctly inserted (Number) 1 2 3 4 5 Red (Colour) Yellow (Pink) All outcomes correctly inserted	B1 B1	Must be inserted in the table and not simply inferred from the outcomes. Accept 'R' for Red and 'Y' for Yellow. Allow 'Red' for 'R' etc. Allow '1R' for 'R1' etc.
4.(b) $\frac{2}{15}$ or equivalent ISW.	B2	(No FT from an incorrect grid in 4a) B1 for a numerator of 2 in a fraction < 1. B1 for a denominator of 15 in a fraction < 1. Allow B2 for 0.13... Penalise -1 for incorrect notation eg '2 out of 15', '2 : 15' etc.
5.(a) 	B2	B1 for either individual shape. Ignore clearly deleted shading.

<p>10.(a) $\frac{1}{6} \times \frac{1}{4}$ or equivalent $= \frac{1}{24}$ ISW</p>	<p>M1 A1</p>	<p>Accept 0.0416... or 0.0417 or 0.042 for M1A1 M1A0 for '1 in 24', '1:24'.</p>																																																
<p>10.(b) $\frac{1}{5} + \frac{1}{10}$ or equivalent. $= \frac{3}{10}$ or equivalent. ISW</p>	<p>M1 A1</p>																																																	
<p>11. $(AC^2 =) 10 \cdot 8^2 + 14 \cdot 4^2$ $AC^2 = 324$ or $(AC =) \sqrt{324}$ $(AC =) 18(\text{cm})$</p> <p>(Area ACD =) $\frac{24 \times 18}{2}$ $= 216 (\text{cm}^2)$</p>	<p>M1 A1 A1 M1 A1</p>	<p>Accept equivalent of using cos rule (as $\cos 90 = 0$). F.T. $\sqrt{\text{their } 324}$ provided M1 gained. Final answer of $AC = 324$ is M1A0A0. <u>Alternative method to find AC</u> A correct and complete method (using two trigonometric relationships) M2 $AC = 18(\text{cm})$ A1</p> <p>FT 'their stated AC'. (May be shown on the diagram) Accept equivalent of using $\frac{1}{2} \times 24 \times 18 \times \sin 90$ (as $\sin 90 = 1$).</p>																																																
<p>12.</p> <p>One correct evaluation $7.2 \leq x \leq 7.3$ 2 correct evaluations $7.275 \leq x \leq 7.295$, one < 0, one > 0. 2 correct evaluations $7.275 \leq x \leq 7.285$, one < 0, one > 0.</p> <p>$x = 7.28$</p>	<p>B1 B1 M1 A1</p>	<p>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 $x^3 - 5x = 350$</p> <table border="0"> <tr> <td>x</td> <td>$x^3 - 5x - 350$</td> <td></td> <td></td> </tr> <tr> <td>7.2</td> <td>-12.75(2)</td> <td></td> <td></td> </tr> <tr> <td>7.21</td> <td>-11(-2..)</td> <td></td> <td></td> </tr> <tr> <td>7.22</td> <td>-9(-7...)</td> <td></td> <td></td> </tr> <tr> <td>7.23</td> <td>-8(-2...)</td> <td></td> <td></td> </tr> <tr> <td>7.24</td> <td>-6(-6...)</td> <td></td> <td></td> </tr> <tr> <td>7.25</td> <td>-5(-1...)</td> <td></td> <td></td> </tr> <tr> <td>7.26</td> <td>-3(-6...)</td> <td>7.275</td> <td>-1(-3....)</td> </tr> <tr> <td>7.27</td> <td>-2(-1...)</td> <td>7.284</td> <td>0(-04..)</td> </tr> <tr> <td>7.28</td> <td>-0.5(7..)</td> <td>7.285</td> <td>0.1(9..)</td> </tr> <tr> <td>7.29</td> <td>0.9(7..)</td> <td>7.295</td> <td>1(-7....)</td> </tr> <tr> <td>7.3</td> <td>2.5(17)</td> <td></td> <td></td> </tr> </table>	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)		
x	$x^3 - 5x - 350$																																																	
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<p>13.(a) an expression</p>	<p>B1</p>																																																	
<p>13.(b) an equation</p>	<p>B1</p>																																																	
<p>14. (Mid-points) 2.5, (7.5), 12.5 and 17.5. $8 \times 2.5 + (0 \times 7.5) + 7 \times 12.5 + 5 \times 17.5$ $(20 + 0 + 87.5 + 87.5 = 195)$</p> <p>$\div 20$ $= 9.75$</p>	<p>B1 M1 m1 A1</p>	<p>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.</p>																																																
<p>15. ($x =$) $\frac{360}{15}$ or $180 - \frac{(15-2) \times 180}{15}$ or equivalent $= 24(^{\circ})$</p> <p>(BR =) $8 \times \cos 24$ or $8 \times \sin (90 - 24)$</p> <p>$= 7.3(0...)(\text{cm})$ or $7.31(\text{cm})$</p>	<p>M1 A1 M2 A1</p>	<p>May be seen in parts.</p> <p>FT 'their stated value for x' ($x < 90^{\circ}$) M1 for $\frac{BR}{8} = \cos 24$ or $\frac{BR}{8} = \sin (90 - 24)$ Accept equivalent of using sin rule (as $\sin 90 = 1$).</p> <p><u>Alternative method to find BR</u> A correct and complete method (using two trigonometric relationships and possibly Pythagoras's theorem) M2 $BR = 7.3(0...)(\text{cm})$ or $7.31(\text{cm})$ A1</p>																																																

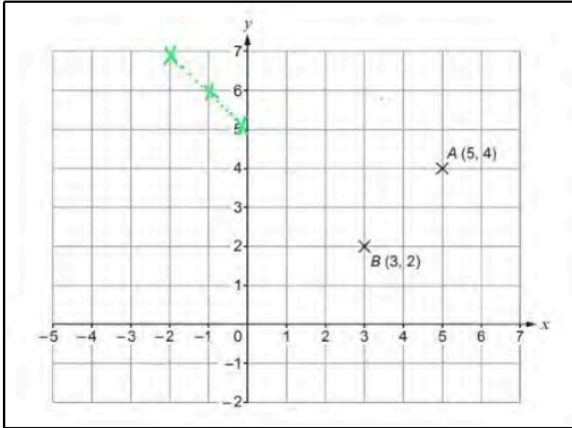
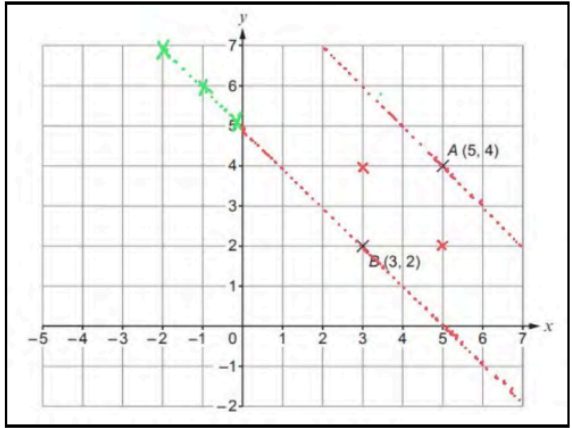
<p>13.(a)</p>	<p>B2</p>	<p>B1 for each individual shape. Ignore clearly deleted shading.</p>
<p>13.(b) Reflection (in the line) $x = 5$</p>	<p>B2</p>	<p>B1 for stating 'Reflection'. Ignore extra wording once 'reflection' (or 'reflected') seen. B1 for stating $x = 5$ (simply drawing the line is B0)</p>
<p>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</p>	<p>B1 B1 B1</p>	<p>FT until 2nd error. Mark final answer. Allow an embedded answer but penalise -1 if contradicted by $x \neq \frac{1}{2}$ or 0.5.</p>
<p>14.(b) $5(n - 3)$ or $5 \times (n - 3)$ or $(n - 3)5$ or $(n - 3) \times 5$ or $5n - 15$</p>	<p>B2</p>	<p>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.</p>
<p>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°.</p>	<p>E1</p>	<p>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.</p>
<p>15.(b) $a + b = 150$</p>	<p>B1</p>	
<p>16. $[n(G \cap S) =] \quad 10$ $[n(S) =] \quad 13$</p>	<p>B1 B1</p>	<p>Entries must be a whole numbers. $[n(\mathcal{E})]$ must be 30 (i.e. no additional 'non-Spanish'). Any blank space to be taken as 0.</p>
<p>17. (Length of AD or BC =) 10 (cm) (Area of ABCD = 5×10 =) 50 (cm²) (Area APB =) $\frac{\pi \times 5^2}{4}$ $= 19.6(\dots)$(cm²) (Shaded area = $50 - 19.6$ =) $30.3(\dots)$ or 30.4(cm²)</p>	<p>B1 B1 M1 A1 B1</p>	<p>May be seen on the diagram or implied in later work. FT $5 \times$ 'their AD (or BC)'. The 50(cm²) may be shown as two areas of 25(cm²) for B1 B1. SC1 for sight of $\pi \times 5^2$ or equivalent ($78.5\dots$) FT 'their stated area ABCD' – 'their stated <u>area</u> APB' <i>Note: Sight of $(25 - \text{'area of APB'}) + 25$ implies the first two B marks. [rectangle divided in half]</i></p>

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 $(-2, y) y \neq 3$. ($\hat{BAC} = 90^\circ$) 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)	<u>Correctly</u> using a common denominator. $\frac{13}{18}$ or equivalent.	M1 A1	Mark final answer.								
16.	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Answer</th> <th>Yes</th> <th>No</th> <th>Not sure</th> </tr> </thead> <tbody> <tr> <td>Number of students</td> <td>150</td> <td>50</td> <td>100</td> </tr> </tbody> </table>	Answer	Yes	No	Not sure	Number of students	150	50	100	B3	B1 for (Yes =) 150 C.A.O. B2 for (No =) 50 AND (Not sure =) 100. or FT 'their Yes' for (No =) $\frac{1}{3}(300 - \text{'Yes'})$ AND (Not sure =) $\frac{2}{3}(300 - \text{'Yes'})$ If B2 not gained, then B1 for (No =) 50 OR (Not sure =) 100 or FT 'their Yes' for (No =) $\frac{1}{3}(300 - \text{'Yes'})$ OR (Not sure =) $\frac{2}{3}(300 - \text{'Yes'})$ or B1 for 'No' + 'Not sure' = 150 or B1 if 'Not sure' = $2 \times \text{'No'}$. or B1 for Yes + No + Not sure = 300.
Answer	Yes	No	Not sure								
Number of students	150	50	100								
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 =) $0.2 \times 80 = 16$	M1 A1 M1 A1	An unsupported answer of 0.56 implies M1 FT 'their <u>stated</u> P(Puffin Island)' $\times 80$, only if 'their <u>stated</u> P(Puffin Island)' < 1 . 16/80 is M1A0 unless 16 has been seen.								
<u>Alternative method</u> (Number of cards showing other 3 islands =) $0.4 \times 80 + 0.15 \times 80 + 0.25 \times 80$ 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 <u>derived</u> 64', only if 'their <u>derived</u> 64' < 80 . 16/80 is M1A0 unless 16 has been seen.								

16.	2.656×10^6	B2	B1 for a correct value but not in standard form. Mark final answer. B1 for sight of 2 656 000. SC1 for 2.66×10^6 or 2.7×10^6 or 2.6×10^6 or 2.65×10^6
17.	Sight of 24.5 AND 15.5 OR Sight of 23.5 AND 14.5 $2(24.5 + 15.5) - 2(23.5 + 14.5)$ or equivalent $= 4(\text{cm})$	B1 M1 A1	Sight of (Greatest =) 80 <u>OR</u> (Least =) 76 implies B1 FT only for upper bounds of 24.4 AND 15.4 or 24.49 AND 15.49 (lower bounds must be 23.5 AND 14.5 else M0) CAO If M0, award B1 and an SC1 for sight of (Greatest =) 80 <u>AND</u> (Least =) 76
<u>Alternative method.</u> <i>Difference between least and greatest length for each side = 1(cm)</i> 4×1 $= 4(\text{cm})$		B1 M1 A1	 FT only for differences of 0.9 or 0.99 CAO
18.	Method to eliminate variable e.g. equal coefficients with <u>appropriate</u> addition or subtraction. First variable found, $x = 4$ or $y = -1$. Substitute to find the 2 nd variable. Second variable found	M1 A1 m1 A1	No marks for trial and improvement. Allow 1 error in one term, not the term with equal coefficients. C.A.O. F.T. their '1 st variable'. Award no marks for unsupported correct answers.
19.(a)(i)	Correct reason given. e.g. 'An angle at the circumference subtended by a diameter is a right angle'. 'line AC is a diameter'	E1	Accept any correct unambiguous wording. The key word is ' <u>diameter</u> '. Allow eg 'angle in a semicircle is 90°', 'line AC goes through the centre'. 'opposite a diameter' Do not accept 'because it's a right angle'.
19.(a)(ii)	$\tan x = \frac{7.5}{4.7}$ $x = \tan^{-1}(7.5 / 4.7)$ or $\tan^{-1} 1.6$ or $\tan^{-1} 1.59(\dots)$ $= 57.9(\dots)^\circ$ or $57.8(\dots)^\circ$ or 58°	M1 m1 A1	Implies M1. C.A.O. <u>Alternative method to find x</u> A correct and complete method (using Pythagoras's theorem and a trigonometric relationship). M2 $x = 57.9(\dots)^\circ$ or $57.8(\dots)^\circ$ or 58° CAO A1
19.(b)	$(y =) 58^\circ$ Correct circle theorem given. e.g. 'angles (at the circumference) subtended by the same chord (or arc) are equal', 'angles in the same segment (are equal)'.	B1 E1	<u>Strict</u> FT of 'their x'. Accept any correct unambiguous wording. Allow eg 'angles on the same chord (are equal)' Do not accept e.g. 'they are equal' on its own.

WJEC GCSE MATHEMATICS
AUTUMN 2021 MARK SCHEME

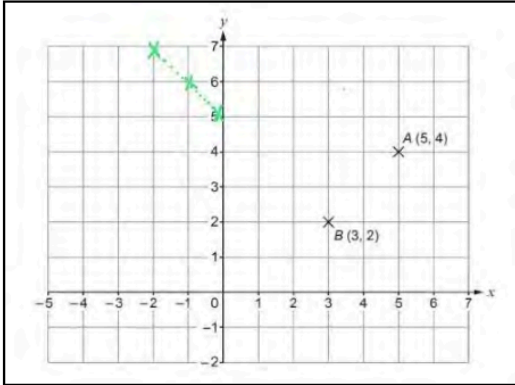
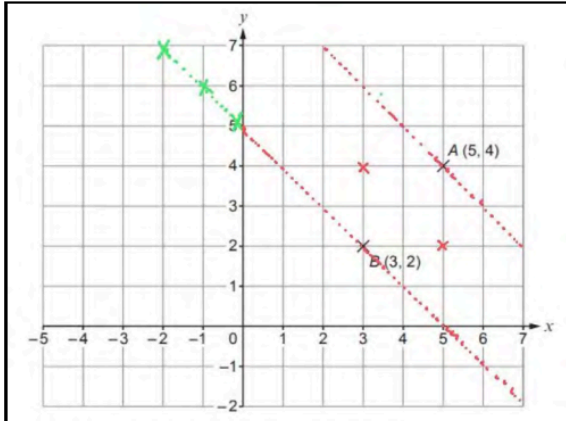
Unit 2: Foundation Tier	Mark	Comments																
1.(a) 5169	B1																	
1.(b) 6502	B1																	
1.(c) 186	B1																	
1.(d) 45	B1																	
2.(a) 5, 5, 5, 5	B1																	
2.(b) Exactly two 3s and any other two numbers	B1	Accept in any order.																
2.(c) 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. <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td style="text-align: center;">71</td> <td style="text-align: center;">60</td> <td style="text-align: center;">78</td> <td style="text-align: center;">41</td> </tr> <tr> <td style="text-align: center;">26</td> <td style="text-align: center;">85</td> <td style="text-align: center;">27</td> <td style="text-align: center;">112</td> </tr> <tr> <td style="text-align: center;">95</td> <td style="text-align: center;">105</td> <td style="text-align: center;">42</td> <td style="text-align: center;">8</td> </tr> <tr> <td style="text-align: center;">58</td> <td style="text-align: center;">0</td> <td style="text-align: center;">103</td> <td style="text-align: center;">89</td> </tr> </tbody> </table>	71	60	78	41	26	85	27	112	95	105	42	8	58	0	103	89	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.
71	60	78	41															
26	85	27	112															
95	105	42	8															
58	0	103	89															
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 \div 4 65.5 or equivalent	M1 m1 A1	Allow for an unsupported value between 173 and 351. Award this m1 for 'their sum' \div 4 CAO. Allow 131/2. If no marks awarded, allow SC1 for (64 + 89 + 83 + 26 \div 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 $23 \frac{1}{25}$ or equivalent e.g. 576/25																
8.(b) 7.9	B1	Accept $7 \frac{9}{10}$ 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 <u>between 40 and 95</u> satisfying 2 of the 3 conditions. (45, 54, 60, 72) B1 for a final answer <u>between 40 and 95</u> 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: <ul style="list-style-type: none"> 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 																

<p>2. (a) (1, 0)</p>	<p>B2</p>	<p>Award B1 for one of the following:</p> <ul style="list-style-type: none"> • if C clearly identified on grid at (1,0) but coordinates not given or are incorrect • for an answer of (4, 3) (midpoint of AB) • for an answer of (1x, 0y) and point not identified.
<p>2. (b) (-1, 6) OR (-2,7)</p> 	<p>B2</p>	<p>Award B2 for any point that satisfies the conditions e.g. (-1.5, 6.5)</p> <p>Award B1 for one of the following:</p> <ul style="list-style-type: none"> • if D identified on grid in a correct position but coordinates not given or are incorrect OR • for the coordinates of any point that creates a right-angled triangle with AB as one side <p>e.g.</p> <p>(0,5) (1,4) (2,3) (4,1) (5,0) (6,-1) (7,-2)</p> <p>(3,4) (5,2)</p> <p>(2,7) (3,6) (4,5) (6,3) (7,2)</p> 

4. (a) ($x =$) 54°	B1	Accept 52° to 56°
4. (b) Angle of 147° drawn at B	B1	Accept 145° to 149°

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

8. corresponding angles	B1	
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<p>12. (a) (1, 0)</p>	<p>B2</p>	<ul style="list-style-type: none"> • use appropriate terminology, units, etc <p>Award B1 for one of the following:</p> <ul style="list-style-type: none"> • if C clearly identified on grid but coordinates not given or are incorrect • for an answer of (4, 3) (midpoint of AB) • for an answer of (1x, 0y) and point not identified.
<p>12. (b) (-1, 6) OR (-2,7)</p> 	<p>B2</p>	<p>Award B2 for any point that satisfies the conditions e.g. (-1.5, 6.5)</p> <p>Award B1 for one of the following:</p> <ul style="list-style-type: none"> • if D identified on grid in a correct position but coordinates not given or are incorrect OR • for the coordinates of any point that creates a right-angled triangle with AB as one side <p>e.g.</p> <p>(0,5) (1,4) (2,3) (4,1) (5,0) (6,-1) (7,-2)</p> <p>(3,4) (5,2)</p> <p>(2,7) (3,6) (4,5) (6,3) (7,2)</p> 

<p>(Expected number of winners = $\frac{7}{12} \times 228$) 133 (winners)</p>	<p>B1</p>	<p>If $\frac{7}{12}$ or correct % or decimal seen in part (c), it must be used for this B1. FT 'their $\frac{7}{12}$' if less than 1×228 Allow $\frac{133}{228}$ or '133 out of 228' Must be whole number Award B0 for $\frac{7}{12} \times 228 = 0.58(333\dots) \times 228 = 132$ winners. Award B0 for $\frac{7}{12} \times 228 = 0.6 \times 228 = 136$ or 137 winners.</p>
<p>(Expected number that don't win = $228 - 133$) 95 (non-winners)</p>	<p>B1</p>	<p>FT 228 – 'their 133' (provided < 228)</p>
<p>(Amount taken = $95 \times \text{£}2.50 =$) (£)237.5(0)</p>	<p>B1</p>	<p>FT $\text{£}2.50 \times$ 'their 95' provided < 133</p>
<p>(Expected profit = $95 \times \text{£}2.50 - 133 \times \text{£}1 =$) (£)104.5(0)</p>	<p>B1</p>	<p>(£)237.5(0) – (£)133 FT 'their (£)237.5(0)' – 'their (£)133' Award B1B1B1B0 for sight of $95 \times \text{£}2.50 - 133 \times \text{£}1$ with an incorrect final answer. If the FT results in a loss, the 'Loss' must be stated, or the</p>

4. (d) Alternative Method 1

(Expected number of winners = $7/12 \times 228$)
133 (winners)

(Expected number that don't win = $228 - 133$)
95 (non-winners)

(Amount taken = $95 \times £2.50 =$) (£)237.5(0)

(Expected profit = $95 \times £2.50 - 133 \times £1 =$)
(£)104.5(0)

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

$7/12 \times 228 = 0.58(333\dots) \times 228 = 132$ winners.

Award B0 for

$7/12 \times 228 = 0.6 \times 228 = 136$ or 137 winners.

B1 FT $228 -$ 'their 133' (provided < 228).

B1 FT $£2.50 \times$ 'their 95' provided < 133 .

(£)237.5(0) – (£)133




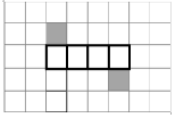
B1 FT 'their (£)237.5(0)' – 'their (£)133'.

Award B1B1B1B0 for sight of

$95 \times £2.50 - 133 \times £1$ 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) <i>Award M1 for the correct values substituted into the Cosine rule.</i>
$(BC^2 =) 256$ 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 $> 12 \cdot 8$.
$CD = 2 \times 60 \div 16$ or equivalent	M2	FT 'their derived BC' OR 'their stated 16' (not derived) provided $12 \cdot 8 < \text{'their stated 16'} < 22 \cdot 4$. Award M1 for $60 = \frac{1}{2} \times 16 \times CD$ or equivalent.
$(CD =) 7 \cdot 5$ (cm)	A1	Allow M2A1 for a correct embedded answer BUT M2A0 if contradicted by $CD \neq 7 \cdot 5$ (cm).

1.(c) 22	B1	
2.(a) 	B1	
2.(b) 	B1	
2.(c) 	B1	
2.(d) Two squares shaded to form a correct net, e.g. 	B1	One square above the four given squares and one below.

<p>2(a) (Cost of fruit scones $36 \times 52p =$ $1872(p)$ or $(£)18.72$ (Cost of cream $4 \times 1.27 =$) $(£)5.08$ (Cost of jam $3 \times 2.16 =$) $(£)6.48$ (Cost of sandwiches $9 \times 7.98 =$) $(£)71.82$</p> <p>(Total costs $18.72 + 5.08 + 6.48 + 71.82 + 230 =$ $(£)332.1(0)$</p> <p>(Needs to save) $(£)332.1(0) - (£)250$ $(£)82.1(0)$</p>	<p>B3</p> <p>B1</p> <p>M1</p> <p>A1</p>	<p>Ignore incorrect units for the first B3 marks Award B3 for all 4 costs correct Award B2 for any 3 costs correct Award B1 for any 2 costs correct</p> <p>FT 'their costs' provided B1 previously awarded and 5 costs, all in consistent units, added</p> <p>FT 'their derived' total costs providing greater than $(£)250$</p> <p>If units given they must be correct. Allow $£82.1(0)p$</p> <p>If no marks awarded, award SC1 for an answer of $£241.93$ for 'their total costs'</p>
<p><u>Alternative method</u></p> <p>2(a) (Cost of fruit scones $36 \times 52p =$ $1872(p)$ or $(£)18.72$ (Cost of cream $4 \times 1.27 =$) $(£)5.08$ (Cost of jam $3 \times 2.16 =$) $(£)6.48$ (Cost of sandwiches $9 \times 7.98 =$) $(£)71.82$</p> <p>(Food costs $18.72 + 5.08 + 6.48 + 71.82 =$ $(£)102.1(0)$</p> <p>(Needs to save) $102.1(0) - (250 - 230)$ $(£)82.1(0)$</p>	<p>B3</p> <p>B1</p> <p>M1</p> <p>A1</p>	<p>Ignore incorrect units for the first B3 marks Award B3 for all 4 costs correct Award B2 for any 3 costs correct Award B1 for any 2 costs correct</p> <p>FT 'their food costs' provided B1 previously awarded and 4 costs, all in consistent units, added</p> <p>FT 'their derived' total food costs</p>
<p>Organisation and communication</p> <p>Writing</p>	<p>OC1</p> <p>W1</p>	<p>For OC1, candidates will be expected to:</p> <ul style="list-style-type: none"> • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanations and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means <p>For W1, candidates will be expected to:</p> <ul style="list-style-type: none"> • 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.
<p>2(b) Correct completed triangle drawn within tolerance. (Use overlay)</p>	<p>B3</p>	<p>Allow if triangle is reflected. B3 or B2 can only be awarded if the measurements are from the given 14cm base line or a new 14cm base line is drawn on the page. Award B2 for</p> <ul style="list-style-type: none"> • $40^\circ (\pm 2^\circ)$ and 14 cm ($\pm 2\text{mm}$) correct but triangle not completed • Either $40^\circ (\pm 2^\circ)$ or 14 cm ($\pm 2\text{mm}$) correct in a completed triangle <p>If B2 not awarded, award B1 for</p> <ul style="list-style-type: none"> • Either $40^\circ (\pm 2^\circ)$ or 14 cm ($\pm 2\text{mm}$) (not the base line) correct in a triangle not completed or using a new base line drawn of any size.

2(c) Diagram showing 4 tables with 18 chairs around the edges with 2 chairs on each of the longer sides and 1 chair on each of the shorter sides.

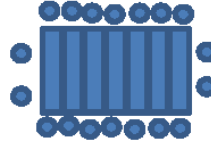


B2 Award B1 for sight of 4 tables in this format with or without chairs

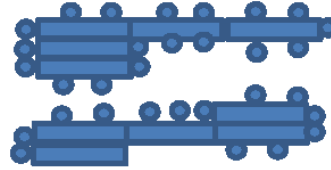


OR

Award B1 for 7 tables with the longer sides touching with 18 chairs



Or B1 for a combination of tables set out with all 18 chairs correctly placed with 2 chairs on each long side and 1 chair on each short side eg



<p>2(a)</p> <p>(Gas usage $21640 - 21345 =$) 295 (kWh)</p> <p>(Cost of gas excluding VAT) 295×7.2 or 295×0.072</p> <p>2124(p) or (£)21.24</p> <p>(Cost of gas including VAT) 2230(.2p) or (£)22.30(2)</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>B2</p>	<p><u>Incorrect unit of money is penalised – 1 once only on the first occurrence, by withholding an A or B mark</u></p> <p>FT 'their 21640 – 21345' for M1 and possible A1</p> <p>FT 'their number of units' including use of 21640 or 21345 or 21640 + 21345 for M1 but A0 Treat '× 0.72' as incorrect units, allow M1 but A0</p> <p>FT 'their cost of gas excluding VAT', accepting rounding or truncation to a penny</p> <p>B1 for one of the following:</p> <ul style="list-style-type: none"> (Cost of gas including VAT) 21(.)24 × 1.05 (VAT) 106(.2p) or (£)1.06(2)
<p>Organisation and communication</p> <p>Writing</p>	<p>OC1</p> <p>W1</p>	<p>For OC1, candidates will be expected to:</p> <ul style="list-style-type: none"> present their response in a structured way explain to the reader what they are doing at each step of their response lay out their explanations and working in a way that is clear and logical write a conclusion that draws together their results and explains what their answer means <p>For W1, candidates will be expected to:</p> <ul style="list-style-type: none"> 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.
<p>2(b) $13.2 \times 7 + 12.2 + 12.4$ (= 117)</p> <p>$\div 9$</p> <p>13 (°C)</p>	<p>M2</p> <p>m1</p> <p>A1</p>	<p>M1 for sight of one of the following:</p> <ul style="list-style-type: none"> 13.2×7 or equivalent 92.4 a sum shown with a given total of 92 to 93 inclusive for 7 possible temperatures <p>FT from M2 or from $12.2 + 12.4 +$ 'their sum with a total of 92 to 93 inclusive for 7 possible temperatures</p> <p>CAO from $117 \div 9$ Answer space takes precedence</p>
<p>2(c)</p> <p>a = 98(°)</p> <p>b = 63(°)</p> <p>c = 117(°)</p>	<p>B1</p> <p>B1</p> <p>B1</p>	<p>Answer space takes precedence</p> <p>FT 180 – 'their b' provided 'their b' $\neq 90^\circ$ or $\neq 180^\circ$</p>

<p>5(a)</p> <p>(Gas usage $21640 - 21345 =$) 295 (kWh)</p> <p>(Cost of gas excluding VAT) 295×7.2 or 295×0.072</p> <p>2124(p) or (£)21.24</p> <p>(Cost of gas including VAT) 2230(.2p) or (£)22.30(2)</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>B2</p>	<p><u>Incorrect unit of money is penalised – 1 once only on the first occurrence, by withholding an A or B mark</u></p> <p>FT 'their 21640 – 21345' for M1 and possible A1</p> <p>FT 'their number of units' including use of 21640 or 21345 or 21640 + 21345 for M1 but A0 Treat '× 0.72' as incorrect units, allow M1 but A0</p> <p>FT 'their cost of gas excluding VAT', accepting rounding or truncation to a penny</p> <p>B1 for one of the following:</p> <ul style="list-style-type: none"> (Cost of gas including VAT) 21(.)24 × 1.05 (VAT) 106(.2p) or (£)1.06(2)
<p>5(b) $13.2 \times 7 + 12.2 + 12.4$ (= 117)</p> <p>+ 9</p> <p>13 (°C)</p>	<p>M2</p> <p>m1</p> <p>A1</p>	<p>M1 for sight of one of the following:</p> <ul style="list-style-type: none"> 13.2×7 or equivalent 92.4 a sum shown with a given total of 92 to 93 inclusive for 7 possible temperatures <p>FT from M2 or from $12.2 + 12.4 +$ 'their sum with a total of 92 to 93 inclusive for 7 possible temperatures</p> <p>CAO from $117 \div 9$ Answer space takes precedence</p>
<p>5(c)</p> <p>a = 98(°)</p> <p>b = 63(°)</p> <p>c = 117(°)</p>	<p>B1</p> <p>B1</p> <p>B1</p>	<p>Answer space takes precedence</p> <p>FT 180 – 'their b' provided 'their b' ≠ 90° or ≠ 180°</p>

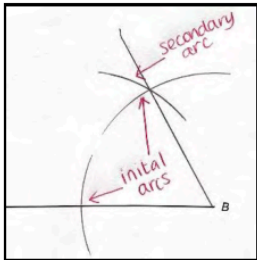
11. 8.4 cm 67° 52°	B1 B1 B1	Accept 8.2 cm to 8.6 cm Accept 65° to 69° Accept 50° to 54° If B1 B1 B1 awarded, penalise -1 if the triangle is incomplete or if a ruler is not used, or if the triangle is a reflection of the correct triangle.
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3.(a) 137°	B1	Accept answers in the range 135° to 139° .
3.(b) Perpendicular line drawn through C.	B1	Allow perpendicular line stopping at C. If two sections are drawn, both must lie within the given tolerance.
0·4.(a) 116	B1	

7. $\alpha = 63(^{\circ})$ $b = 117(^{\circ})$ $c = 117(^{\circ})$	B1 B1 B1	Answer line takes precedence. Check diagram for answers if no answers written on answer lines. FT 'their b '.
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$d = 13$	B1	Strict F.1 . 100 – 'their a ' – 'their b ' – 'their c '
7.(a) acute	B1	
7.(b) obtuse	B1	

11.(a) $(x \Rightarrow) 360 - (115 + 97 + 42)$ or equivalent. $= 106$	M1 A1	Check diagram for answer. Note: $360 - 254$ Note: Award M1A1 for a correct embedded answer BUT only M1A0 if contradicted by $x \neq 106$.
11.(b) $y = \frac{180 - 78}{2}$ $= 51$	M1 A1	Check diagram for answer. Note: $\frac{102}{2}$ Award M1 for sight of $78 + y + y = 180$. Note: Award M1A1 for a correct embedded answer BUT only M1A0 if contradicted by $y \neq 51$.

<p>14.(a) Correct construction of 60°</p>	<p>B1</p>	<p>Must be at point <i>B</i>. Correct construction arcs (two or three) must be seen (initial and secondary). BO if 60° and 30° drawn. Ignore additional lines provided intended 60° is clear (e.g any triangle, including equilateral <i>ABC</i>). For example:</p> 
<p>14.(b) Correct construction of 90°</p>	<p>B1</p>	<p>Must be at point <i>R</i> above or below <i>LM</i>. Correct construction arcs (initial and secondary) must be seen.</p>
<p>14.(c) <u>All</u> correct construction arcs shown</p> <p style="text-align: right;">Line drawn</p>	<p>M1</p> <p style="text-align: right;">A1</p>	<p>Arc, <u>centre P</u>, intersecting <i>XY</i> at two points. (<i>X</i> may be one of the points with no arc seen at point <i>X</i>) [Note to markers: These arcs may be identified by the fact that they will 'cross the line <i>XY</i> at an acute angle'. Arcs 'crossing the line at 90°' is evidence of an inappropriate method.] AND Intersecting arcs (equal radii) using the above two points as centres. Ignore line extended above <i>XY</i> for M1.</p> <p>Ignore line extended above <i>XY</i> for M1A1.</p>
<p>14.(c) <u>Alternative method</u> (Using the properties of a kite.) <u>All</u> correct construction arcs shown.</p> <p style="text-align: right;">Line drawn</p>	<p>M1</p> <p style="text-align: right;">A1</p>	<p><i>Intersecting arcs whose centres are any two points on the line <i>XY</i> and respective radii equal in length to the distance from the points to the point <i>P</i>.</i></p> <p><i>[Note to markers: The arcs will always intersect at a point that is a 'reflection of point <i>P</i>' in the line <i>XY</i>.]</i></p>

<p>15.</p> $(AC^2 =) 8^2 + 6^2$ $(AC =) \sqrt{8^2 + 6^2} \text{ or equivalent}$ $(AC =) 10 \text{ (cm)}$ <p>(Curved length =)</p> <ul style="list-style-type: none"> • $\frac{6 \times 3 \cdot 14}{2}$ • $\frac{2 \times 3 \times 3 \cdot 14}{2}$ • $3 \times 3 \cdot 14$ • 3π • $9 \cdot 42$ or equivalent <p>(Perimeter of shape = $8 + 10 + 9 \cdot 42 =$) $27 \cdot 42$(cm)</p>	<p>M1 m1 A1</p> <p>B1</p> <p>A1</p>	<p>Check diagram. Note: $(AC^2 =) 64 + 36$ FT from $\sqrt{\text{their } 8^2} + \text{their } 6^2$ CAO. Final answer of $AC = 100$ is M1m0A0.</p> <p>Do not ignore subsequent working e.g. $3 \times 3 \cdot 14 = 9 \cdot 42$, then $9 \cdot 42 \times 2$ or $9 \cdot 42 + 2$ would gain B0.</p> <p>Allow $27 \cdot 4$(cm). Award A0 for $18 + 3\pi$. FT 'their AC' only if M1 gained. FT 'their curved length' only if B0 awarded and for one of the following: <ul style="list-style-type: none"> • $3 \cdot 14$ used to find the circumference of a circle • area of a semicircle used. <p>For example, M1m1A1 awarded for 10 (cm), B1 for $3 \times 3 \cdot 14 = 9$ (cm) A0 for $8 + 10 + 9 = 27$ (cm) as B1 previously awarded.</p> <p>Note, if a final answer of: <ul style="list-style-type: none"> • $33 \cdot 4(2)$(cm) is given (6cm also included) award M1m1A1B1A0 • $36 \cdot 8(4)$(cm) is given (full circumference used) award M1m1A1B0A1 • $32 \cdot 1(3)$ (cm) is given (area semicircle used) award M1m1A1B0A1. </p> </p>
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16.(b)

Four numbers (in any order) with a total of 28 and range of 6
e.g.

3	7	9	9
3	8	8	9
4	7	7	10
4	6	8	10
4	5	9	10
4	4	10	10
5	5	7	11
5	6	6	11

B2

Numbers may be seen in any order.
Accept answers using fractions and decimals.
FT 'their total' from 16(a).

Award B1 for **four** numbers with one of the following:

- total = 28
- total = 'their total' from 16(a)
- range = 6.

<p>18.</p> $\frac{\pi \times r^2}{2} = 77 \text{ or equivalent}$ $r^2 = 49(\cdot 0\dots) \text{ or } r^2 = \frac{154}{\pi}$ $r = 7(\cdot 0\dots)$ <p>(Area of trapezium =) $\frac{2 \times 7(\cdot 0\dots) + 22}{2} \times 7(\cdot 0\dots)$ or equivalent</p> $= 126 \cdot 0(\dots)(\text{cm}^2)$	<p>M1</p> <p>m1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>Check diagram for answers.</p> <p>Sight of $49(\cdot 0\dots)$ implies M1m1.</p> <p>FT 'their r^2', provided M1 awarded. 7 must not be from incorrect working.</p> <p>FT 'their derived or stated r'.</p> <p>Accept $126 \cdot 1$ or $126 \text{ (cm}^2\text{)}$ Mark final answer.</p>
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1(a) (i) A 3cm by 2cm rectangle drawn so that it is at least 2cm from the back of the house at least 1cm from everything else.	B1 B1	Penalise -1 once only if the diagram is not a 3cm by 2cm rectangle but is another sized square or rectangle.
1(a)(ii) 6 m ²	B1	Do NOT FT from 'their rectangle' drawn in (a)(i)
1(b)(i) an acute angle	B1	
1(b)(ii) 42° (±2°) drawn at T	B1	Use of overlay NOTE: The angle drawn must be drawn at point T, using the given horizontal line. However, do award B1 if they redraw the given diagram and the angle of 42° (±2°) is correct. Award B1 for an angle of 42° (±2°) clearly indicated if they use a vertical line at T or have extended the horizontal line to the left of T (i.e. drawn 138° and then indicated 42°).
1(b)(iii) 180 – 69 111 (°)	M1 A1	Accept 69 + 42 or 21 + 90 or 31 + 80

8(a)			
$\frac{1}{5}$ is \$40, total amount of gift is) 40×5 or $40 \div \frac{1}{5}$		M1	Ignore \$ written as £ or €, etc
	(\$)200	A1	ISW
(Amount gifted to animal charity is $\frac{1}{4} \times 200$)	(\$)50	B1	FT $\frac{1}{4} \times$ 'their 200' correctly evaluated, provided <ul style="list-style-type: none"> • 'their 200' $\neq 40$ • 'their 200' $\neq 200 - 40 (= 160)$ Allow FT 'their 200' = 8 (see note below)
(Gift to medical research is) (\$) $200 - 40 - 50$		M1	FT 'their derived 200' $- 40 -$ 'their 50', provided > 0
	(\$) 110	A1	FT provided both M marks previously awarded
			<i>If no marks, award SC1 for</i> $(40 - \frac{1}{5} \times 40 - \frac{1}{4} \times 40 = 40 - 8 - 10 =) (\$)22$

4.(a)(i)	85°	B1	
4.(a)(ii)	95°	B1	
4.(b)	Unambiguous parallel line, drawn through the	B1	Mark intention.

5(a) a = 54° b = 54° c = 78°	B1 B1 B1	Answer spaces take precedence, if blank check the diagram FT 'their a' FT 132 – 'their a' or 132 – 'their b'
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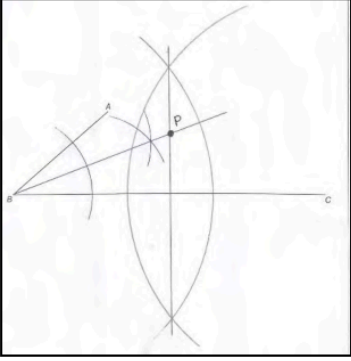
<p>5(b)(i) (Number of revolutions is) $\frac{1000}{\pi \times 29} \div 12$ or $\frac{1000 \times 12}{\pi \times 29}$ or equivalent</p> <p>Answer in the inclusive range 131 to 132 (revolutions)</p>	<p>M3</p> <p>A1</p>	<p>Complete method May be seen in stages</p> <p>M2 for any one of the following, or equivalents:</p> <ul style="list-style-type: none"> • $\pi \times 29 \div 12$ • $\frac{1000}{\pi \times 29}$ • $\frac{\pi \times 29}{1000 \times 12}$ • $\frac{1000}{\pi \times (29 \div 2) \div 12}$ • $\frac{1000}{\pi \times (2 \times 29) \div 12}$ <p>M1 for any one of the following, that may be embedded in other working:</p> <ul style="list-style-type: none"> • $29 \div 12$ (= 2.4(1666...)) • 1000×12 (= 12000) • $\pi \times 29$ (= 91.06 to 91.118) • $\frac{1000}{\pi \times n \div 12}$ where $n \neq 0$, e.g. $1000 \times 12 \div (\pi \times 29^2)$ • $\frac{1000}{29 \div 12}$ (= 413.79...) • $1000 \times 12 \div 29$ (= 413.79...) <p>CAO</p>
<p>5(b)(ii) $(10 \times) 29 \times 30 \div 12$ or equivalent or for an answer of 72.5</p> <p>725 (mm)</p>	<p>M2</p> <p>A1</p>	<p>Allow embedded with an incorrect change of units Allow $(10 \times) 2.4(16\dots) \times 30$</p> <p>M1 for any one of the following:</p> <ul style="list-style-type: none"> • $30 \div 12$ (= 2.5) • $29 \div 12$ (= 2.4166...) • sight of 2.4, 2.41, 2.416(6...) or 2.42 • sight of (1 inch =) 2.5 (cm) <p>Answer space takes precedence Allow answers in the range 720 (mm) to 726 (mm) from premature approximation, not from incorrect working</p>
<p>5(c) (Average speed in km/h =) $\frac{48}{1.5}$ or equivalent</p> <p>32 (km/h)</p>	<p>M2</p> <p>A1</p>	<p>M1 for sight of $\frac{48}{1.3}$ or $\frac{48}{90}$ or for answers of 36.9(...) or 37 or 0.53(33...)</p> <p>CAO. Answer space takes precedence</p>

<p>9(a) (Sale price) $45 - 0.18 \times 45$ or $45 \times (1 - 0.18)$ or $45 - 8.1(0)$ or 45×0.82 <p style="text-align: right;">(£)36.9(0)</p> <p>(Maggie's mum pays) $8 \times 36.9(0) \div (8 + 1)$ or $36.9(0) - 36.9(0) \div (8 + 1)$ $8 \times 4.1(0)$ or $36.9(0) - 4.1(0)$ <p style="text-align: right;">(£)32.8(0)</p> </p></p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>May be seen or implied in further working</p> <p>FT 'their £36.90'</p> <p>On FT allow rounded or truncated to a penny</p>
<p>9(a) <u>Alternative method</u> (Maggie's mum's share of original price) $8 \times 45 \div (8 + 1)$ or $45 - 45 \div (8 + 1)$ <p style="text-align: right;">(£) 40</p> <p>(Maggie's mum pays) $40 - 0.18 \times 40$ or $40 \times (1 - 0.18)$ or $40 - 7.2(0)$ or 40×0.82 <p style="text-align: right;">(£)32.8(0)</p> </p></p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>May be seen or implied in further working</p> <p>FT 'their £40'</p> <p>On FT allow rounded or truncated to a penny</p>
<p>9(b) (Area) $\frac{1}{2} \times 1.5 \times (3.1 + 4.5)$ <p style="text-align: right;">5.7 (m²)</p> <p>(Charge) $2.5(0) \times 5.7$ <p style="text-align: right;">(£) 14.25</p> </p></p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>Accept rounding to 6 (m²) May be seen or implied in further working</p> <p>FT 'their 5.7' (including if previously rounded to 6), including if 'their 5.7' is not an area Allow if 'their area' is costed in parts provided there is an attempt to sum all of the part costs, provided 'their 5.7' \neq 1.5, 3.1 or 4.5</p> <p>CAO</p>

<p>18.(a) Statement explaining that, 'The tangent at any point on a circle is perpendicular (or equivalent) to the radius at that point'.</p>	E1	<p>Accept unambiguous similar wording. e.g. 'Radius and tangent 90(°)' 'The angle between a tangent and radius is 90(°)' Diameter could be used in place of radius. Must refer to tangent and radius by name (not simply <i>AF</i> and <i>OB</i> or description).</p>
<p>18.(b)</p> $(AOB =) 180 - 90 - 42 \text{ or } 90 - 42$ $48 (^\circ)$ $x = 24(^\circ)$	<p>M1 A1 B1</p>	<p>Check diagram for answers. Note: 180 – 132 May be implied by sight of a final answer of 24. FT 'their 48' ÷ 2, provided 'their 48' ≠ 42.</p>
<p>18.(b) <i>Alternative method</i></p> $(x =) \frac{180 - 90 - 42}{2} \text{ or } \frac{90 - 42}{2}$ $x = 24(^\circ)$	<p>M2 A1</p>	<p>Check diagram for answers. Award M2 for complete method.</p>

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 $m = 34 \div 7$ is awarded B0B0). Allow B1B1 for a correct embedded answer BUT only B1B0 if contradicted by $m \neq 4$.

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

<p>12.</p> <p>Correct construction of bisector of angle ABC</p> <p>Correct construction of perpendicular bisector of BC</p> <p>Correct position of point P</p> 	<p>B1</p> <p>B1</p> <p>B1</p>	<p>Correct construction arcs (initial and secondary) and a line joining B to the point of intersection of the arcs must be seen or an alternative valid method.</p> <p>Two correct pairs of intersecting construction arcs and a line joining both of these points of intersection must be seen.</p> <p>CAO. Award B1 for the correct point of intersection and not labelled P, provided no other incorrect points are indicated. (May be awarded from previous B0B0.)</p>
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Unit 1: Foundation Tier	Mark	Comments
15.		Check diagram for answers but answer line takes precedence.
$(x = 180 -) 90 - 64$ or equivalent $= 26(^{\circ})$	M1 A1	
$(y =) 26(^{\circ})$	B1	FT $y =$ 'their x '.
$(z =) \frac{180 - 26}{2}$ $= 77(^{\circ})$	M1 A1	FT 'their y ', provided $y \neq 90^{\circ}$ or 60° .

<p>16. $13 \cdot 8^2 = BD^2 + 7 \cdot 3^2$ OR $(BD^2 =) 13 \cdot 8^2 - 7 \cdot 3^2$ or equivalent</p> <p>$(BD =) \sqrt{13 \cdot 8^2 - 7 \cdot 3^2}$ or equivalent</p> <p>$(BD =) 11 \cdot 7(1 \dots)$ (cm)</p> <p>$y = \sin^{-1} \left(\frac{5 \cdot 5}{11 \cdot 7} \right)$ or</p> <p>$\sin^{-1} \frac{5 \cdot 5 \times \sin 90}{11 \cdot 7}$ or equivalent</p> <p>$y = 28(\cdot 0 \dots)$</p>	<p>M1</p> <p>m1</p> <p>A1</p> <p>M2</p> <p>A1</p>	<p>Check diagram for answers. Note: $190 \cdot 44 - 53 \cdot 29 = 137 \cdot 15$</p> <p>Note: $(BD =) \sqrt{137 \cdot 15}$ FT 'their 137·15' for m1 only, provided M1 previously gained.</p> <p>CAO. Final answer of $BD = 137 \cdot 15$ is M1m0A0. Accept an answer rounded or truncated to at least 1 decimal place. If $\sqrt{137 \cdot 15}$ is used correctly for BD in subsequent work, then award this A1 retrospectively. An unsupported answer of $11 \cdot 7(1 \dots)$ (cm) is awarded M1m1A1.</p> <p>Check diagram for answers. FT 'their stated BD' (may be on diagram), provided $> 5 \cdot 5$.</p> <p>Award M1 for one of the following:</p> <ul style="list-style-type: none"> $\sin y = \left(\frac{5 \cdot 5}{11 \cdot 7} \right) (= 0 \cdot 47(0 \dots))$ $\frac{\sin y}{5 \cdot 5} = \frac{\sin 90}{11 \cdot 7}$ or equivalent <p>Accept an answer rounded or truncated.</p> <p>An unsupported answer of $28(\cdot 0 \dots)$ is awarded M1m1A1M2A1. Allow correct angles given in radians or gradians:</p> <table border="1" data-bbox="850 1059 1366 1211"> <thead> <tr> <th>Method</th> <th>Radians</th> <th>Gradians</th> </tr> </thead> <tbody> <tr> <td>$\sin^{-1} \frac{5 \cdot 5}{11 \cdot 7}$</td> <td>0·4893...</td> <td>31·155....</td> </tr> <tr> <td>$\sin^{-1} \frac{5 \cdot 5 \times \sin 90}{11 \cdot 7}$</td> <td>0·4337...</td> <td>30·738....</td> </tr> </tbody> </table>	Method	Radians	Gradians	$\sin^{-1} \frac{5 \cdot 5}{11 \cdot 7}$	0·4893...	31·155....	$\sin^{-1} \frac{5 \cdot 5 \times \sin 90}{11 \cdot 7}$	0·4337...	30·738....
Method	Radians	Gradians									
$\sin^{-1} \frac{5 \cdot 5}{11 \cdot 7}$	0·4893...	31·155....									
$\sin^{-1} \frac{5 \cdot 5 \times \sin 90}{11 \cdot 7}$	0·4337...	30·738....									
<p>16. <u>Alternative method for first 3 marks</u> Correct use of a 'two-step' method.</p> <p>$(BD =) 11 \cdot 7(1 \dots)$ (cm)</p>	<p>M2</p> <p>A1</p>	<p>A partial trigonometric method is M0.</p>									
<p>16. <u>Alternative method for final 3 marks</u> Correct use of a 'two-step' method.</p> <p>$(y =) 28(\cdot 0)$</p>	<p>M2</p> <p>A1</p>	<p>A partial trigonometric method is M0.</p> <p>Allow correct angles given in radians or gradians.</p>									

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	<p>Answer space takes precedence Answers and/or workings may be seen on the diagram</p> <p>For B3, allow answers in the inclusive range 14.4 (metres) to 15.6 (metres)</p> <p>Award B2 for any one of the following:</p> <ul style="list-style-type: none"> • Scale factor of 2 • Scale factor of $\frac{1}{2}$ • (\times) 2 • (\times) 200 • ($28 \div 14 =$) 2 • $28 \div 2 = 14$ (embedded scale factor of 2) • $14 \times 2 = 28$ (embedded scale factor of 2) • Implied scale factor of 2 e.g. double 'their 7.5' • 1(cm) is 2(m) or equivalent <p>Do not award B2 if $28 \times 2 = 56$ alone is seen as this does not indicate a scale factor of 2</p> <p>Award B1 for any one of the following:</p> <ul style="list-style-type: none"> • One correct measurement seen or implied. • 7.5 (cm) \pm 2 mm • 14 (cm) \pm 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($^{\circ}$)' 'No, as the angle is bigger than a right angle' No, acute is less than 90 ($^{\circ}$)' 'No, angle is obtuse' 'No, it's obtuse'	E1	<p>Reasons may be indicated on the diagram.</p> <p>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',</p> <p>Do not allow 'No, because an acute angle is 70($^{\circ}$)' 'No, because it's not an acute angle' 'No because an acute angle is not 157'</p>
3(d)(ii) Correct line drawn from Bryn	B2	<p>Use of overlay Award B1 for either</p> <ul style="list-style-type: none"> • 157$^{\circ}$ (\pm 2$^{\circ}$) drawn at Bryn • 7cm (\pm 2mm) line drawn from Bryn <p>No marks awarded for a line drawn at Alex</p>

4(a) Correctly drawn angle of 57° at E	B1	Accept 55° to 59° Ignore any line drawn from F; e.g. a completed triangle.
4(b) $90^\circ \div 2$ or equivalent 45°	M1 A1	

<p>9.(a) A correct explanation, e.g.</p> <ul style="list-style-type: none"> • 'He didn't write the numbers in (ascending/ descending) order (before identifying the middle number)'. • 'The median is 11'. • '20 is the largest number'. 	E1	<ul style="list-style-type: none"> • sight of 152 (but not 152B) <p>Allow</p> <ul style="list-style-type: none"> • 'because it's 11' • '20 is not the middle number' • a demonstration of how to correctly calculate the median e.g. circling the middle number in an ordered list. <p>Do not accept '11' or 'the median is the middle'.</p> <p>Do not ignore contradictory or incorrect comments e.g. 'put them in order first. the median is 14'</p>
<p>9.(b)(i) Sum of numbers (339)</p> <p>Sum of numbers \div 5</p> <p>$67 \cdot 8$ or $\frac{339}{5}$ or equivalent</p>	<p>M1</p> <p>m1</p> <p>A1</p>	<p>Allow for an unsupported value between 250 and 428.</p> <p>Award this m1 for 'their sum' \div 5</p> <p>CAO.</p> <p>ISW for candidates who go on to round their answer to 68.</p> <p>Do not allow $339 \div 5$.</p> <p>If no marks, award either:</p> <ul style="list-style-type: none"> • SC2 for an unsupported answer of 68 • SC1 for $(59 + 89 + 77 + 31 + 83 \div 5 =) 272 \cdot 6$ or equivalent.
<p>9.(b)(ii) $(67 \cdot 8 - 3 =) 64 \cdot 8$ or $\frac{324}{5}$</p>	B1	<p>F.T. 'their mean' from (a).</p> <p>Do not allow $324 \div 5$.</p>

<p>11.</p> <p>(Electricity cost is) $654 \times (\pounds)0.30$ $(\pounds)196.2(0)$ or $19620(p)$</p> <p>(Cost of electricity and standing charge is $\pounds 196.20 + 54 =$) $(\pounds) 250.2(0)$</p> <p>(Total bill including VAT) $1.05 \times 250.2(0)$ or $250.2(0) + 12.51$</p> <p style="text-align: right;">$(\pounds)262.71$</p>	<p>M1</p> <p>A1</p> <p>B1</p> <p>M1</p> <p>A1</p>	<p>tins with 3, or their area with $4.8(m^2)$ is given</p> <p><u>Incorrect unit of money is penalised -1 once only on the first occurrence, by withholding an A or B mark</u></p> <p>Accept $654 \times 30(p)$</p> <p>If units are given they must be correct</p> <p>Accept $\pounds 196.20p$</p> <p>FT provided 654 used in a calculation for 'their cost of electricity'</p> <p>Do not accept if embedded with an incorrect interpretation of the standing charge, e.g. $196.20 + 3 \times 54 = (\pounds)358.20$ is B0</p> <p>If previous M0 A0 B0 for $(654 \times (\pounds)0.30 \times 3 =) \pounds 588.60$ AND $(588.60 + 54 \times 3 = 588.60 + 162 =) \pounds 750.60$, award SC1 for this consistent misunderstanding and then FT</p> <p>FT from 'their derived total of electricity' + 'their standing charge', accept rounding or truncation to a penny</p> <p>Allow M1 A0 for $1.05 \times$ 'their total rounded or truncated to a whole pound'</p> <p>If M0 A0 for inclusive of VAT cost, allow SC1 for an answer of $(\pounds)262.70$, provided not from incorrect working (allow from $250.20 + 12.50$)</p> <p>If final B0 M0 A0, award SC1 for the correct evaluation of $1.05 \times$ 'their derived cost of electricity' having not considered and omitted the standing charge, or previously subtracted the standing charge from 'their cost of electricity'</p>
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<p>14.(a)</p> <p>$(AC^2 =) 13 \cdot 5^2 + 10 \cdot 8^2$ or equivalent</p> <p>$(AC =) \sqrt{13 \cdot 5^2 + 10 \cdot 8^2}$ or equivalent</p> <p>(AC =) 17.3 or 17.2(88...) or 17.29 or $\frac{27\sqrt{41}}{10}$ (cm)</p>	<p>M1</p> <p>m1</p> <p>A1</p>	<p>Check diagram for answers.</p> <p>$(AC^2 =) 182 \cdot 25 + 116 \cdot 64 = 298 \cdot 89$.</p> <p>$(AC =) \sqrt{298 \cdot 89}$.</p> <p>Sight of $\sqrt{\text{their } 298 \cdot 89}$ or $\sqrt{\text{their } 298 \cdot 89}$ evaluated is awarded m1 provided M1 previously gained.</p> <p>CAO.</p> <p>Mark final answer.</p> <p>Allow 17 provided from correct workings.</p> <p>Final answer of $AC = 298 \cdot 89$ is M1m0A0.</p> <p>Accept a rounded or truncated answer.</p> <p>An unsupported correct answer is awarded M1m1A1.</p>						
<p><u>14.(a) Alternative method</u></p> <p>Correct use of a two-step trigonometric method</p> <p>(AC =) 17.3 or 17.2(88...) or 17.29 or $\frac{27\sqrt{41}}{10}$ (cm)</p>	<p>M2</p> <p>A1</p>	<p>A partial trigonometric method is awarded M0.</p> <p>CAO.</p> <p>Mark final answer.</p> <p>Allow 17 provided from correct workings.</p> <p>Accept a rounded or truncated answer.</p>						
<p>14. (b)</p> <p>$(x =) \tan^{-1} \frac{19 \cdot 8}{8 \cdot 7}$</p> <p>An answer in the range 66.2 to 66.32</p>	<p>M2</p> <p>A1</p>	<p>Check diagram for answers.</p> <p>Award M1 for $\tan x = \frac{19 \cdot 8}{8 \cdot 7} (= 2 \cdot 275(8..))$</p> <p>Mark final answer.</p> <p>Allow 66 provided from correct workings.</p> <p>Accept a rounded or truncated answer.</p> <p>Allow correct angles given in radians or gradians.</p> <table border="1" data-bbox="852 1111 1422 1196"> <thead> <tr> <th></th> <th>Radians</th> <th>Gradians</th> </tr> </thead> <tbody> <tr> <td>$\tan^{-1} \frac{19 \cdot 8}{8 \cdot 7}$</td> <td>1.1567...</td> <td>73.6440...</td> </tr> </tbody> </table>		Radians	Gradians	$\tan^{-1} \frac{19 \cdot 8}{8 \cdot 7}$	1.1567...	73.6440...
	Radians	Gradians						
$\tan^{-1} \frac{19 \cdot 8}{8 \cdot 7}$	1.1567...	73.6440...						
<p><u>14.(b) Alternative method</u></p> <p>Correct use of a two-step trigonometric method</p> <p>An answer in the range 66.2 to 66.32</p>	<p>M2</p> <p>A1</p>	<p>A partial trigonometric method is awarded M0.</p> <p>Mark final answer.</p> <p>Allow 66 provided from correct workings.</p> <p>Accept a rounded or truncated answer.</p> <p>Allow correct angles given in radians or gradians.</p>						

<p>15.</p> <p>Correct bisector of 60°</p> <p>Arc of radius 5 cm, centre B.</p> <p>Correct region identified.</p>	<p>B2</p> <p>B1</p> <p>B1</p>	<p>Allow a tolerance of $\pm 2^\circ$ and $\pm 2\text{mm}$. The construction need not be below the line for the B2 and the first B1 (but the final B1 won't be awarded).</p> <p>Allow at A or B. Correct construction arcs (initial and secondary) must be seen or an alternative valid method. The angle must be formed for the bisector and the line must reach the intersection of the arcs.</p> <p>Award B1 for one of the following:</p> <ul style="list-style-type: none"> • correct construction of 60° at A or B. The initial and secondary construction arcs must be seen but line forming the angle may not need to be seen (depending on method) • correct bisector of 'their acute angle' at A or B. The initial and secondary construction arcs and bisector line must be seen and reach the intersection of the arcs. <p>For B1, the arc must be of sufficient length so as not to be considered a 'point' or a 'notch' i.e. for a sector of at least 10° at B.</p> <p>For this B1, the region must be:</p> <ul style="list-style-type: none"> • in the correct location at B • below the line • include an angle • include an arc. <p>FT if at least B1 previously awarded.</p>
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