REVISE
.wales

F3.09 — Bar charts, pictograms, pie charts & line graphs

Mark schemes for the F3.09 question pack

Spec 4.2.1, 4.2.2, 4.2.3 — Unit 3

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 23 questions in the corresponding revise.wales question pack (51 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

3. Correct pie chart showing two sectors with angles 120° and 240°	B3	*Allow ± 2°.* *If B3 not gained.* *$\frac{8}{24} \times 360$ OR $\frac{16}{24} \times 360$* *M1* *= 120(°) OR = 240(°)* *A1* *Correct drawing of 'their angle' F.T.* *A1* *(Possible M1A0A1 for incorrect calculation OR possible M1A1A0 for incorrect drawing)*
Correct labelling.	B1	For any diagram showing <u>just two</u> sectors with the largest sector labelled 'awake' and smallest sector labelled 'asleep'. Allow equivalent unambiguous labels or key BUT NOT just 120(°) and 240(°) or just 8(hr) and 16(hr)

11. Correct pie chart showing two sectors with angles 120° and 240°	B3	*Allow ± 2°.* *If B3 not gained.* *$\frac{8}{24} \times 360$ OR $\frac{16}{24} \times 360$* *M1* *= 120(°) OR = 240(°)* *A1* *Correct drawing of 'their angle' F.T.* *A1* *(Possible M1A0A1 for incorrect calculation OR possible M1A1A0 for incorrect drawing)*
Correct labelling.	B1	For any diagram showing <u>just two</u> sectors with the largest sector labelled 'awake' and smallest sector labelled 'asleep'. Allow equivalent unambiguous labels or key BUT NOT just 120(°) and 240(°) or just 8(hr) and 16(hr).

5(a) 481·63	B1	Do not accept 481·630
5(b) 64	B1	
5(c) 7	B1	Do not accept 7x7 or 7x7=49 alone.
5(d) (0)·03825	B1	
Ribbon mark 6(a),(b),(c),(d) 6(a) Football	B1	
Ribbon mark 6(a),(b),(c),(d) 6(b) 1/4 or equivalent ISW	B1	Do not accept incorrect notation; e.g. 1 in 4,1 out of 4, 1:4.
Ribbon mark 6(a),(b),(c),(d) 6(c) 1/4 × 60 15	M1 A1	Accept 15 out of 60. Award SC1 only, for a final answer of 15/60
Ribbon mark 6(a),(b),(c),(d) 6(d) Correctly labelled axes. Uniform scale starting from zero. Correct equal width bars for football, swimming and tennis.	B1 B1 B1	Vertical axis labelled 'number (of people)' or '*people*' or 'frequency' AND horizontal axis marked with the sports. Correct heights for 'their scale' (30 and 15) FT their (c) if possible: 'their swimming' = 'their tennis' AND either 'their football' = 2 x 'their tennis' or 'their football' = 60 – 2 x 'their tennis'. If no scale visible, allow final B1 for bars drawn in correct proportions.
7.(Number across = 20÷4=) 5 OR (Number down = 6÷2 =) 3 (Total number of small rectangles =) 5 × 3 15	B1 M1 A1	Sight of 5 or 3, not in incorrect statement or working FT 'their stated across and down' CAO
7. <u>*Alternative method*</u> *(Area rectangle A=2×4=) 8 (cm^2) OR* *(Area rectangle B=6×20=) 120 (cm^2)* *(No. of rectangle A=) 120 ÷ 8* *15*	B1 M1 A1	Sight of 8 or 120, not in incorrect statement or working FT 'their stated areas' CAO
Organisation and Communication	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means

8.(c)	4000 mm^3	B1	
9.(a)	$\frac{60}{300} \times 100$ or equivalent 20(%)	M1 A1	Allow sight of 20/100, 0·2 for M1. M0 for 60/300 alone.
9.(b)	$0{\cdot}4 \times 360$ or equivalent e.g. $\frac{360}{100} \times 40$ 144(°)	M1 A1	

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

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

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.*

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

2. –36·2	B2	Mark final answer. Award B1 for one of the following: • sight of –64·4 (not –64·4p) • sight of (+)28·2 (not 28·2q and not –28·2) • –36·2 (with additional letters).

3(a) **Use** of 1 million as 1 000 000	B1	May be seen at any stage of working or implied by a correct answer Accept from sight of 2.2 million written as 2 200 000 Allow as implied from one of the following: • sight of an appropriate stage of working, e.g. 1% as 22 000 or 10% as 220 000 or 50% as 1 100 000 • an answer of 40 000 provided not from 0.2 × 2 million
0.02 × 2.2 (× 1 000 000) or (1 000 000 ×) 2.2 ÷ 50 or equivalent	M1	The method must be for the intention of finding 2% of 2.2 million, not any other percentage May be implied, from a full method, from sight of • 0.02 × 'digits 22 with place value error' • when working not shown, only non-zero digits of 44 in their answers Award M0 for 1.02 × 2.2 or 0.98 × 2.2 or 0.2 × 2.2
(£) 44 000 or (£) 44,000	A1	CAO. Answer space takes precedence Do not accept (£)0.044 (million) or 44.000 (A0) unless 44000 seen in working (A1)

3(b)(i) $\frac{115}{360}$	B1	
3(b)(ii) Gold 20° ±2°	B1	Check the diagram
$1800 \times \frac{20\ (\pm 2)}{360}$ or $5 \times (20\ (\pm 2))$ or equivalent	M1	Also implies previous B1 FT for any value used for '20' provided ≠180° and < 360°) for M1 only (including use of 160°)
100 (gold medals)	A1	A correct answer from using 20°±2° in the inclusive range 90 to 110 (gold medals), not from premature approximation (20/360 = 0.05, then 0.05 × 1800 = 90 B1 M1 A0)

		• use appropriate terminology, units, etc
6.(a) Bars drawn correctly, 8 for rabbit and 1 for hamster.	B2	For B2, bars must be two squares wide. Condone inconsistent gap between bars. B1 for one of the following: • any indication of 8 rabbits and 1 hamster • any indication of 9 rabbits and 0 hamsters (if drawn on bar chart, the 9 must be unambiguous).
6.(b) $\frac{7}{22}$ ISW	B2	B1 for one of the following: • a numerator of 7 in a fraction < 1. • a denominator of 22 in a fraction < 1.

6(a) (Direct^2 =) $200^2 + 350^2$ Direct^2 = 162500 or (Direct =) $\sqrt{162500}$	M1 A1	
(Direct =) 403(.11... m) or $50\sqrt{65}$ (m) or $\sqrt{162500}$ (m)	A1	FT from M1 for the correctly evaluated square root of 'their 162500' provided 'their answer' > 350 (m) May be implied in further working Mark final answer or the answer they go on to use, but then FT
(Extra distance =) 200 + 350 – 403(.1...) or 200 + 350 – $50\sqrt{65}$ or 200 + 350 – $\sqrt{162500}$	M1	FT 'their derived 403(.11…)' > 350 and from an attempt to use Pythagoras' Theorem
146.8(87....m) or 146.9(m) or 147(m)	A1	

6(b)(i) Selects or unambiguously implies 'No' with a reason, e.g. 'the median is in group >200m to 1000m (and he lives 200m away)', 'median is more than 200m away (but Ronnie is 200m away)'	E1	Needs to compare 200(m) with median >200(m) The 200(m) can be implied from selecting 'No' Ignore additional spurious statements Allow 'No' with a reason, e.g. 'Ronnie's distance is in the first group, the median is in the second group' 'Ronnie only travels 200m which is less than the median (distance)' 'because the median distance travelled is between 200m and 1000m' 'Ronnie doesn't travel the distance of the 17.5(th) person' 'Ronnie doesn't travel the distance of the 17(th) (or 18th) person' 'the median 17.5(th)' 'the median 17(th) (or 18(th))' 'he only walks 200m when the (median) distance is higher' 'he only walks 200m which is less than the median' 'can't estimate exact number from the group 200< d ≤ 1000' 'the median **could** be 880' '9 less than half of 35' '26 students walk further than him' Do not accept 'No' with a reason e.g. 'Ronnie's distance is in the first group' 'the median **is** 250m'
6(b)(ii) Midpoints 150, 600, 2000, 5000 150×9 + 600×10 + 2000×15 + 5000×1 (= 1350 + 6000 + 30000 + 5000 = 42350 m) ÷ 35 1210 (m)	B1 M1 m1 A1	Check the table Sight of 7750 implies correct midpoints FT 'their midpoints' provided at least 3 are within or at the bounds of the appropriate groups Answer space takes precedence
6(c) (140 ÷ 7 =) 20 or 140 ÷ 20 = 7 or 7 × 20 = 140 1 2 3 4 5 6 7 **2 22 42 62 82 102 122**	B1 B1	May be implied by any of the following: • consistent position patterns + 20 indicated for at least 4 consecutive positions e.g. (2,) 20, 40, 60, 80, 100, 120 • sight of 22 for student 2 with no further working or entries CAO

7(a) Whiskers at 3 m and 22 m Unambiguous values or box with LQ 5 m and UQ 20 m Median at 15 m	B1 B1 B1	Ignore if lines omitted from the ends of the whiskers Must be the least and greatest values shown May be seen in working, must be clearly LQ and UQ Check cumulative frequency diagram If not clearly labelled in working or on the graph, they must be no other values given between • the least and the LQ, and • the greatest and the UQ May be seen in working, must be clearly the median Check cumulative frequency diagram If not an unambiguous unique line or point, i.e. not clearly labelled in working or on the graph, allow for a line (or point) indicated that is not the least or greatest value shown Only if B1 B1 B1 awarded, <u>penalise -1</u> if a correct format for a box-and-whisker diagram is not shown
7(b)(i) 0.75 × 68 or equivalent 51 (yachts)	M1 A1	 Answer space takes precedence If no marks, award SC1 for sight of 17 (from 0.25 × 68)
7(b)(ii) Conclusion 'Eog' with sight of (Eog IQR 20 – 5 =) 15 (m) AND (Clwyd IQR 18 – 10 =) 8 (m)	B2	FT 'their UQ – LQ' from (a) box-and–whisker diagram B1 for either IQR correct
7(b)(iii) Conclusion 'Can't tell' with reason, e.g. 'only know that 25% of yachts in Clwyd Marina are greater than 18m' 'we don't know if any of the yachts in Clwyd Marina are greater than 22(metres, the longest in Eog Marina)' 'we don't know if a yacht in Clwyd Marina is greater than 22(metres)' 'it doesn't say maximum length of Clwyd Marina's results'	E1	Ignore any additional incorrect or spurious statements Allow 'Can't tell' with a reason, e.g. 'no raw data' 'don't know this information' 'doesn't show anywhere the biggest yacht in Clwyd Marina' 'we are only given some of the lengths of the yachts in the marinas' 'doesn't show Clwyd Marina's results' 'not specified' 'not specific' 'range not given for the Clwyd Marina (so can't identify the longest yacht)' Do not accept, e.g. 'don't know how many yachts in the marinas' 'not mentioned for either marina'

13.(b) Pie chart drawn correctly and both sectors labelled correctly Angle for Red = 100° Angle for Yellow = 80°	B2	For B2, FT their angles from (a), provided they add up to 180°. Allow tolerance of ±2° for all angles. Award B1 for one of the following: • correct angles but both not correctly labelled (1 or 2 omitted or reversed) • one correct angle (from FT) and correctly labelled.

13.(c)	$\frac{70}{90}$	OR	$\frac{7}{9}$	OR	$\frac{280}{360}$	or equivalent. ISW	B2	FT 'their 45' + 25 or 'their 100°'+ 180°, where possible. Award B1 for one of the following: • a numerator of 70 or 280 in a fraction < 1 • a denominator of 90 or 360 in a fraction < 1 • sight of adding two correct fractions for red and blue. Penalise incorrect notation (e.g. '70 in 90') −1.

5.(a) Correctly drawn pie chart within tolerance **AND** correctly labelled **Red** = 72(°) (allow 70° to 74°) **Green** = 108(°) (allow 106° to 110°)	B3	Award B2 for one of the following: • correctly drawn pie chart within tolerance but not labelled or incorrectly labelled • pie chart drawn within tolerance but not a straight line • pie chart drawn not starting from the centre (but with end point within tolerance) • sight of red = 72(°) • sight of green = 108(°). Award B1 for sight of one of the following: • 72(°) • 108(°) • (red=) $\frac{2}{10} \times 360$ or equivalent • (red=) $\frac{2}{5} \times 180$ or equivalent • (green=) $\frac{3}{10} \times 360$ or equivalent • (green=) $\frac{3}{5} \times 180$ or equivalent • 'their **derived** 72' and 'their **derived** 108' drawn correctly, provided that 'their 72' + 'their 108' = 180 and identified as red and green, and not 90°.
5.(b) D A C B	B2	Award B2 for writing the correct fractions in order $\frac{1}{7}$ $\frac{1}{6}$ $\frac{1}{4}$ $\frac{1}{2}$ Award B1 for one of the following: • sight of correct fractions • BCAD (reversed order) DCB in order: *A*DCB, DC*A*B, DCB*A*, DCB DAC in order: *B*DAC, D*B*AC, DA*B*C, DAC DAB in order: *C*DAB, DC*A*B, DAB*C*, DABC ACB in order: A*D*CB, AC*D*B, ACB*D*, ACB Do not accept repeated letters.

Correctly drawn pie chart within tolerance **AND** correctly labelled **Red** = 72(°) (allow 70° to 74°) **Green** = 108(°) (allow 106° to 110°)	B3	Award B2 for one of the following: • correctly drawn pie chart within tolerance but not labelled or incorrectly labelled • pie chart drawn within tolerance but not a straight line • pie chart drawn not starting from the centre (but end point within tolerance) • sight of red = 72(°) • sight of green = 108(°). Award B1 for sight of one of the following: • 72(°) • 108(°) • (red=) $\frac{2}{10} \times 360$ or equivalent • (red=) $\frac{2}{5} \times 180$ or equivalent • (green=) $\frac{3}{10} \times 360$ or equivalent • (green=) $\frac{3}{5} \times 180$ or equivalent • 'their **derived** 72' and 'their **derived** 108' drawn correctly, provided that 'their 72' + 'their 108' = 180 and identified as red and green, and not 90°.

2(a) $\frac{90}{360} \times 540$ or ¼ × 540 or 540 ÷ 4 or equivalent	M1	
135 (people)	A1	Answer space takes precedence When repeatedly halving 540, if there are errors, award M0 A0 unless indication that the intention is to divide by 2, e.g. • 540 ÷ 2 = 220 (error) , 220 ÷ 2 = 110 is M1 A0 • 540, 220, 110 is M0 A0
2(b) Angle measured 170(°) ± 2(°)	B1	May be seen on the pie chart
0.4 × 170(° ± 2°) or equivalent	M1	FT for 'their angle, provided 90° < 'their angle' < 180° Any method of repeated addition must **clearly** be addition to 40%
68(°) or angle in the range 67(°) to 69 (°)	A1	Only allow angles in this range provided not from incorrect working Answer space takes precedence Allow A1 for labelled angle on the pie chart if no **final** answer given. On FT, using 'their 170', allow angles correctly rounded or truncated to the nearest degree
2(c) $540 - \frac{7}{10} \times 540$ or $(1 - \frac{7}{10}) \times 540$ or $\frac{3}{10} \times 540$	M1	For complete method
162 (not children)	A1	Answer space takes precedence If no marks, award SC1 for sight of $(\frac{7}{10} \times 540 =)$ 378

5. 20 × 25 + 28 × 15 + 17 × 10 (= 500 + 420 + 170)	M2	M1 for either • sight of the **sum** of any 2 unique appropriate products (not multiples of these products) or • for sight of 20×25, 28×15 and 17×10
(£) 1090	A2	CAO. Answer space takes precedence FT from M2 or M1 to award A1 for either • any 2 of 500, 420 and 170 in a correctly evaluated sum of 3 products or • sight of 500, 420 and 170 **<u>If no marks</u>**, • award SC1 for sight of (Saturday and Sunday interchanged) 17 × 25 + 28 × 15 + 20 × 10 **AND** EITHER SC2 for an answer of (£)1045 OR SC1 for one of the following: • any 2 of 425, 420 and 200 in a correctly evaluated sum of 3 products • sight of 425, 420 and 200 • award SC1 for sight of (table followed in order used in Venn) 20 × 25 + 17 × 15 + 28 × 10 **AND** EITHER SC2 for an answer of (£)1035 OR SC1 for one of the following: • any 2 of 500, 255 and 280 in a correctly evaluated sum of 3 products • sight of 500, 255 and 280

9(a)(i) Entries 146 and 160 in the table and the cumulative frequency diagram completed correctly (correct plots (11, 146) and (13, 160) and all plots joined)	B2	B1 for any one of the following: • 146 and 160 in the table, correct plots but **not** joined • 146 and 160 in the table, with one correct plot and one incorrect plot in completing the **cumulative** frequency diagram with plots joined • one error in the table, including FT 'their 146' + 14 and these **cumulative** entries used correctly to complete the **cumulative** frequency diagram with plots joined • correct cumulative frequency diagram with plots joined, with incorrect, incomplete or not attempted entries in the table
9(a)(ii) 8.2 to 8.4 (minutes)	B1	Answer space takes precedence Allow 8 minutes 12 seconds to 8 minutes 24 seconds FT reading from the graph for 'their median', from ½ × 'their 160', provided 'their 160' ≥ 110, with a tolerance of ½ small square from 'their **cumulative** frequency graph', provided it is possible to read 'their median' from the vertical axis on the graph paper provided
9(a)(iii) 7.2 minutes	B1	Answer space in the statement takes precedence, if blank award for indication of '7.2' (circled) in the list Allow '7' in the answer space provided 7.2 indicated in the list Do not accept '8' in the answer space if 7.2 indicated in the list
9(a)(iv) $\frac{20}{160}$ (× 100) or $\frac{1}{2}$ × 25 (%) or equivalent 12.5 (%) or 12½ (%)	M1 A1	FT for (100 ×) 20/'their 160', provided 'their 160'> 106 On FT allow rounding or truncation to 1 decimal place
9(b) (Costs are 180 + 220) (£) 400 **AND** (Profit is 700 – 180 – 220) (£) 300 **OR** (Receipts / Costs =) $\frac{700}{400}$ (× 100) (Percentage profit is) $\frac{300}{400}$ (× 100) or $\frac{700}{400}$ (× 100) – 1 (× 100) 75 (%)	B1 M1 A1	May be embedded, e.g. 700 – 400 = 300 (= 1.75 or 175%) FT 'their 400' and 700 – 'their 400' provided their costs or profit are ≠ 180, ≠ 220 and ≠ 700 CAO Allow if all costs and the total are consistently multiplied by 3.
9(c) 8(.)40 ÷ 1(.)20 or 8(.)40 – 8(.)40 ÷ 6 or equivalent (£) 7 or 700 (p)	M1 A1	Accept a **complete** and **convincing** method of trial and improvement If units are given they must be correct Sight of 7 + 1.40 = 8.40 is awarded M1 A0 unless (£)7 is selected

Unit 2: Foundation Tier	Mark	Comments
1.(a) Suitable explanation e.g. 'Morgan has added £99 (and not 99p)' 'the units are different' 'Morgan has added pence and pounds' 'Morgan typed in 99 not 0.99' 'Didn't put 0. in front of 99'	E1	Allow: 'Morgan has forgotten the decimal point for the 99 pence' 'Didn't put the dot in front of 99' 'Adds them all up instead of putting 0 in front of 99p' 'he didn't put decimal place he added as whole numbers' *'numbers added together with decimal point after the number (99)'* 'Morgan added £98.01 onto the actual cost' '2.70 + 0.99 + 1.30 + 1.95 + 7.49 (=14.43)' 'he forgot that it was 99p' 'didn't use 99p for bananas' 'Morgan has forgotten to put one of the decimal places in' Do not accept: 'he added them up incorrectly' 'it should be (£)14.43' 'he put 99 when it should be 9.9' '2.70 + 99p + 1.30 + 1.95 + 7.49 = £14.43' 'he has not made the 99p £1' 'he didn't use his calculator' 'he didn't put the dot in' 'he put the decimal in which made it a higher number it = £14.43' (not clear enough)
1. (b) 20 – (2.70 + 0.99 + 1.30 + 1.95 + 7.49) or equivalent (£)5.57	M1 A1	(£)20 – (£)14.43 Allow 14.43 - 20 Accept 2.70 + 99 + 1.30 + 1.95 + 7.49 seen if it leads to the correct answer. FT 'their 14.43' if clearly stated in (a) and is <20 for M1 only. CAO If no marks awarded, award SC1 for sight of (£)14.43. May be seen on shopping list or in part (a).

4(a)(i) $\frac{1}{3} \times 7200 \times \frac{90}{360}$ or $\frac{1}{3} \times 7200 \div 4$ or $2400 \div 4$ or $\frac{1}{3} \times 1800$ 600 (Irish females)	M2 A1	M1 for any one of the following: • $7200 \times \frac{90}{360}$ (= 1800) • $7200 \div 4$ (= 1800) • (7200 ÷ 3 =) 2400 CAO
4(a)(ii) (Number of adult Welsh spectators) $7200 \times \frac{110}{360} \times 6 \div (6 + 5)$ 1200	M2 A2	M1 for any one of the following: • $7200 \times \frac{110}{360}$ (=2200) • $7200 \times 6 \div (6 + 5)$ (=3927.2727….) • $110 \times 6 \div (6 + 5)$ (=60) • 'their number of Welsh spectators' × 6 ÷ (6 + 5) A1 for any one of the following <u>correctly evaluated</u>: • $(7200 \times \frac{110}{360} =)$ 2200 • (7200 ÷ 360 =) 20 **and** (110 × 6 ÷ 11 =) 60 • 'their $7200 \times \frac{110}{360}$ ' × 6 ÷ 11 • 'their 7200 × 6 ÷ 11' × $\frac{110}{360}$ • 'their 110 × 6 ÷ 11' × 20 • 'their number of Welsh spectators' × 6 ÷ 11

Unit 1: Intermediate Tier	Mark	Comments
4(b) (Total of all entrance fees is) (Cycling entrance fees £) 2000 × 25 + (Cycling and athletics entrance fees £) 4000 × 40 + (Athletics entrance fee £) 1200 × 30 (£) 246 000	M2 A1	For the sum of the three appropriate products *(50 000 +)* *(160 000 +)* *(36 000)* M1 for any one of the following: • at least two appropriate products • one appropriate product in a sum of 3 products CAO
Organisation and communication 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 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 For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.

Unit 1: Intermediate Tier	Mark	Comments
8(a)(i) 200 – 80 or 90 + 30 120 (customers)	M1 A1	
8(a)(ii) 32 seconds	B1	
8(a)(iii) $\frac{200-170}{200}$ or $\frac{30}{200}$ or $\frac{15}{100}$ $\frac{3}{20}$	M1 A1	Award M1 for 0.15 or 15% Only ignore further working if written as 0.15 or 15% If no marks, award SC1 for an answer of $\frac{17}{20}$ (from 40 seconds or less)
8(b)(i) 36	B1	
8(b)(ii) 46 – 20 26	M1 A1	Allow 20 – 46
8(c) 'No' unambiguously stated or implied AND a reason, e.g. 'upper quartile is higher this year' '75% reading higher this year' 'interval was 37 (or 38) to 50 seconds last year, this year it is 46 to 50 seconds'	E1	Do not ignore incorrect values for the upper quartiles given, E0 if 'upper quartile' or '75%' stated with incorrect upper quartile readings Allow 'No' with a reason, e.g. '(last year) 38, (this year) 46' '(last year) 37.(…), (this year) 46' Do not accept, e.g. 'range greater this year' 'lower quartile is lower this year' 'median higher this year' 'customers still waiting at 50 seconds'

Unit 2: Intermediate Tier	Mark	Comments
10. (Distribution = 360 – 60 – 138 =) 162(°)	B1	May be seen on diagram.
$\frac{162}{360}$ or $\frac{9}{20}$ or equivalent	M1	FT 'their stated 162', provided obtuse.
= 0·45	A1	Answer must be given as a decimal. Mark final answer. FT provided 'their fraction' < 1. If 0·45 seen, but then 45% or $\frac{45}{100}$ or equivalent award B1M1A1. Award B1 M1 A0 for 45% or equivalent (not a decimal) if 0·45 not seen. If no marks, award SC1 for the correctly evaluated decimal equivalent of an answer of 'their stated 162' 60 + 138 + 'their stated 162' e.g. $\frac{154}{352}$ = 0·4375 (angle measured in diagram) An unsupported answer of 0·45 is awarded B1M1A1.
10. Alternative method *$1 - \frac{198}{360}$ or $1 - \frac{11}{20}$ or equivalent*	*M2*	*Award M1 for $1 - \frac{\text{'their 138 + 60'}}{360}$.*
= 0·45	*A1*	*Answer must be given as a decimal.* *Mark final answer.* *FT provided 1 – 'their fraction < 1'.*

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

End of solutions