1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
1.		$\frac{4}{5}\times 75$ =60 60 ÷ 5 = 12 3 × 12 = 36 2 × 12 = 24	Roger 24 Bethan 36	4	M1 $\frac{4}{5}\times 75$ M1 '60' ÷ (3+2) A1 Roger 24 A1 Bethan 36 (Allow 3 marks for the correct numbers the wrong way round)
					Total for Question: 4 marks
2.		x / $f(x) = x^3 - 5x$ 4.00 44.00 4.10 48.42 4.20 53.09 4.30 58.01 4.40 63.18 68.62 or 4.50 68.63 4.60 74.34 4.70 80.32 4.80 86.59 4.90 93.15 5.00 100.00 4.35 60.56	4.3	4	B2 for trial between 4.3 and 4.4 inclusive (B1 for trial between 4 and 5 inclusive) B1 for different trial between 4.33 and 4.37 inclusive B1 (dep on at least one previous B1) for 4.3 only NB trials where x has 1 d.p should be rounded or truncated to at least 2 SF; trials where x has 2 d.p. or more should be rounded or truncated to at least 3 SF
					Total for Question: 4 marks

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
3.		$25^2 - 7^2 = 576$ $\sqrt{576} = 24$ $\frac{1}{2} \times 24 \times 7$	84 cm^2	4	M1 $25^2 - 7^2$ M1 $\sqrt{25^2 - 7^2}$ M1 (dep) $\frac{1}{2} \times '24' \times 7$ A1 cao
					Total for Question: 4 marks
4. **FE**	(a)	18000 – 6475 = 11525 $11525 \times \frac{20}{100} = 2305$	£ 1152.50	4	M1 $18000 - 6475$ A1 11525 M1 '11525' $\times \frac{20}{100}$ A1 £1152.50
	(b)	$\frac{'2305'}{18000} \times 100$	12.8	2	M1 $\frac{'2305'}{18000} \times 100$ A1 ft on '2305'
					Total for Question: 6 marks

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
5.	(a)	0: 8 1: 023578 2: 0122233 3: 1345 4: 456 Key 4 I 6 means 46 minutes	Correct stem and leaf	3	B3 Fully correct (B2 All entries correct, no key) (B1 correct entries unordered, key or no key) **OR** (B2 Three rows correct, key or no key) (B1 Two rows correct, key or no key)
	(b)	Old median = 22 New median = 22 + 5	27 minutes	2	M1 finds median correctly for original data and adds 5 A1 cao **OR** M1 Redoes table (ft) with each value increased by 5 and attempts to find median A1 cao
	(c)		The same + reason	1	C1 All the values have increased by 5 minutes so when you subtract the 5 minutes will cancel out.
					Total for Question: 6 marks

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
6. **FE QWC ii, iii**	(a)	1 gallon = 4.54 litres, 200 gallons = 908 litres = 908000 cm^3 Vol of tank $60^2 \times x \pi \times 180$ = 2035752.04..cm^3 908000< 1017876.02 **OR** Vol of tank $60^2 \times \pi \times 180$ = 2035752.04..cm^3 Half vol of tank = 1017876.02 cm^3 = 1017.876…litres 1017.876 ÷ 4.54 = 224 gallons 224 > 200	No	5	Response may convert into gallons, litres, or cm^3 Calculations may be performed in different orders M1 Using formulae to find volume of tank B1 Converts between litres and cubic centimetres M1 reads off graph for 1l, 2l , 4l, 5l or 10 litres within tolerance (4.4 – 4.6) A1 Answer in cm^3, litres or gallons C1 Decision and reason **QWC: Decision should be stated, with appropriate supporting statement**
	(b)	"908000" cm^3 × 0.85 g/cm^3 = 771800 g	771.8	3	M1 "908000" × 0.85 M1(dep) 771800÷1000 A1 770 – 772
					Total for Question: 8 marks
7.		$\frac{10 + 45 + 150 + 245 + 225 + 55}{120}$	6.08 hours	4	M1 for mid interval values M1 for multiplying frequencies by mid-interval values M1 for adding (freq × mid-interval values) ÷ 120 A1 cao
					Total for Question: 4 marks

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
8.	(a)	Fred pays $\frac{x}{3}$ and Jim pays $\frac{x-10}{2}$ Malcolm gets £170 for Fred and Jim, so Malcolm gets $\frac{x}{3}+\frac{x-10}{2}=170$	Clear and coherent explanation	1	C1 a clear and coherent explanation
	(b)	Fred has $\frac{2x}{3}$ left, so solving for x using $\frac{x}{3}+\frac{x-10}{2}=170$ $2x+3(x-10)=170\times6$ $5x=1050$ $x=210$ **OR** $\frac{x}{3}+\frac{x-10}{2}=\frac{2x+3(x-10)}{6}$ $\frac{5x-30}{6}=170$ $5x=1050$ $x=210$	£140	4	M1 multiply through by 6 and cancels fractions M1 (dep)expand $3(x-10)$ M1 (dep)collect terms on each side correctly A1 cao **OR** M1 collects terms over 6 M1(dep) expand $3(x-10)$ M1(dep) multiply through by 6 and collect terms A1 cao
					Total for Question: 5 marks

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
9. **QWC** **i, iii** **FE**		Makes a comparison of the shape of the distribution by drawing Makes a comparison of the modal classes(31—40, 11—20) Makes a comparison of the class intervals that contain the medians.(31—40, 21—30) Works out an estimate of the total sales of each shop(2635, 3530)	Correct comparisons	4	B1, B1, B1 for any 4 of the following done correctly Plots frequency polygon or produces table compares modes compares medians compares total sales C1 for comments on shape of the distributions **QWC: Decisions should be stated, and all comments should be clear and follow through from any working or diagrams**
					Total for Question: 4 marks

1MA0/2H					
Question		Working	Answer	Mark	Additional Guidance
10.	(a)	$x^{3/2} \times x^{1/2}$	x^2	3	B1 $x^{3/2}$ seen B1 $x^{2/4}$ oe seen A1 cao
	(b)	$x^2 - 1x + 2x - 2 = 18$ $x^2 + x - 20 = 0$ $(x + 5)(x - 4)$	$4, -5$	4	M1 Correct expansion B1 $x^2 + x - 20 = 0$ B1 $(x + 5)(x - 4)$ A1 cao
	(c)	$x^2 + x - 6 = 0$ $(x + 3)(x - 2)$ $x = -3, x = 2$	$x = -3, y = 8$ $x = 2, y = 3$	5	M1 Sets equations equal and rearranges B1 $x^2 + x - 6 = 0$ oe B1 $(x - 3)(x + 2)$ A2 Two correct pair of solutions A1 correct set of x values
					Total for Question: 12 marks

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
11.	(a)		28	1	B1 27 – 29
	(b)	68 – 42	26	2	M1 68 – 42 A1 26 – 30 (need $\frac{1}{2}$ sq tolerance on each)
FE	(c)	15% of 80 = 12	Yes, with correct conclusion	2	M1 looks up 68 or 40 min on cumulative frequency A1 correct conclusion
					Total for Question: 5 marks
12. **QWC ii, iii** **FE**		sin 68° = $\frac{AC}{8.5}$ AC = 8.5 × sin 68° = 7.881 7.881 + 1 < 9	Reason supported by calculation	4	M1 sin 68° = $\frac{AC}{8.5}$ M1 AC = 8.5 × sin 68° A1 7.88(1… C1 8.88(1… + conclusion **QWC: Decision should be stated, supported by clearly laid out working** Note $\frac{AC}{\sin 68} = \frac{8.5}{\sin 90}$ does not get marks until in the form $AC = \frac{8.5}{\sin 90} \times \sin 68$
					Total for Question: 4 marks

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
13.		$T = k\sqrt{A}$; 40 = $k\sqrt{100}$ $k = 4$ $T = 4\sqrt{A}$ $T = 4\sqrt{60}$	31.0	4	M1 $T = k\sqrt{A}$ M1 40 = $k\sqrt{100}$ A1 $T = 4\sqrt{A}$ A1 for 30.98... or 31(.0) **OR** M2 for $\frac{T}{40} = \sqrt{\frac{60}{100}}$ oe M1 for $T = 40 \times \sqrt{\frac{60}{100}}$ oe A1 for 30.98... or 31.0
					Total for Question: 4 marks

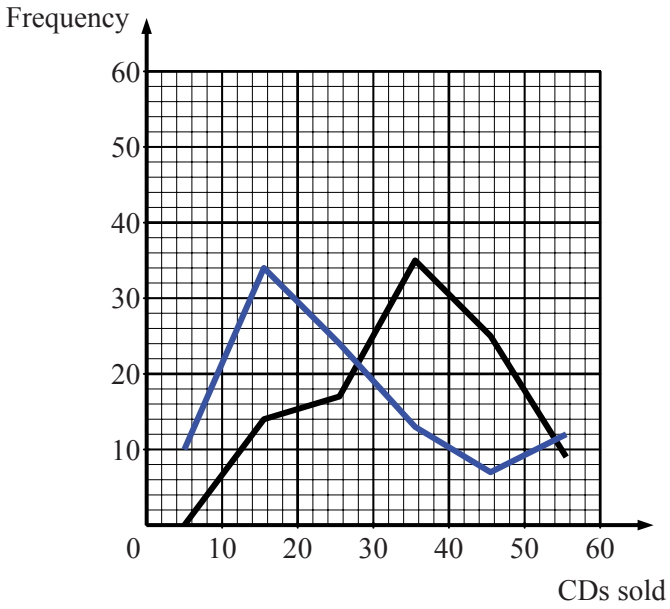
1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
14.	(b)	Eliminate y to get $2x + 3 = 4x + 2, x = 0.5$ $y = 4$ **OR** $y = 2x + 3$ and $y = 4x + 2$ drawn correctly on graph paper Perpendicular drawn correctly through (0.5, 4) Intercept found Gradient found	$y = -0.5x + 4.25$	5	M1 eliminate y M1 substitute the found value of x in one equation A1 both answers M1 an equation of the form $y = mx + c$ with either c correct or m correct or the correct gradient stated A1 cao **OR** B1 $y = 2x + 3$ drawn B1 $y = 4x + 2$ drawn M1 draws perpendicular though point of intersection M1 an equation of the form $y = mx + c$ with either c correct or m correct or the correct gradient stated A1 cao
					Total for Question: 5 marks
15.	(a)	UB 8.35 × 3.65 = 30.4775	30.4775	2	M1 sight of 8.35 or 3.65 A1 30.4775
	(b)	LB 8.25 × 3.55 = 29.2875	30	2	M1 8.25 × 3.55 A1 30 (dep on 8.25 X 3.55 seen)
					Total for Question: 4 marks

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
16.	(a)	Vol = $x \times (x - 2) \times 2 = 51$ Vol = $2x^2 - 4x - 51 = 0$	Derives given answer and condition	4	M1 Vol = $x \times (x - 2) \times 2$ M1 expands bracket correctly A1 (E1) sets equal to 51 B1 $x > 2$ as the lengths of the cuboid have to be positive.
	(b)	$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \times 2 \times (-51)}}{2 \times 2}$ $x = \frac{4 \pm \sqrt{424}}{4}$	6.15, -4.15 both to 3sf	3	M1 correct substitution (allow sign errors in *a*, *b* and *c*) into quadratic formula M1 $x = \frac{4 \pm \sqrt{424}}{4}$ A1 6.14(7…, – 4.14(7…)
					Total for Question: 7 marks
17.		Angle *BAC* = 180° − 47° − 58° = 75° $\frac{AC}{\sin 47} = \frac{220}{\sin 75} (= \frac{AB}{\sin 58})$ $AC = \frac{220 \sin 47}{\sin 75}$ = 166.57.. Area= $\frac{1}{2} \times 220 \times '166.57' \times \sin 58$ = 15538	15500 m^2	5	B1 for 75° M1 $\frac{AC}{\sin 47} = \frac{220}{\sin 75} (= \frac{AB}{\sin 58})$ M1 *AC* = $\frac{220 \sin 47}{\sin 75}$ M1 $\frac{1}{2}$ × 220 × "166.57" × sin58 A1 15500 m^2
					Total for Question: 5 marks

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
18.		Pentagon = 5 equal isos triangles $\frac{360}{5}$ =72° Base angles = (180 – 72) ÷ 2 = 54° for finding equal sides of isosceles triangle; $\frac{x}{\sin 54} = \frac{10}{\sin 72}$ = 8.506508084… area of isosceles triangle = $\frac{1}{2}x^2 \sin 72$ = 34.40954801.. area of pentagon = 5 × 34.40954801 = 172.0477401 area of dodecahedron = 12 ×172.0477401 **OR** Using right-angled trigonometry; h = 5tan54° = 6.8819… Area of isosceles triangle = $\frac{1}{2} \times 10 \times h$ = 34.40954801… area of pentagon = 5 × 34.40954801 = 172.0477401 area of dodecahedron = 12 ×172.0477401	2065 cm^2	9	B1 for $\frac{360}{5}$ = 72° B1 (180 – 72) ÷ 2 = 54° M1 for finding equal sides of isosceles triangle; $x = \frac{x}{\sin 54} = \frac{10}{\sin 72}$ A1 for x = 8.506508084… M1 for finding area of isosceles triangle = $\frac{1}{2}x^2 \sin 72$ A1 for 34.40954801…(ft) B1 for area of pentagon = 5 × (ft) = 172.0477401…(ft) B1 for area of dodecahedron = 12 × (ft)= 2064.572881… cm^2 A1 for 2065 cm^2 (oe) **OR** B1 for $\frac{360}{5}$ = 72° B1 (180 – 72) ÷ 2 = 54 ° M1 for using right-angled trigonometry; h = 5 tan54° A1 for 6.8819… M1 for finding area of isosceles triangle = $\frac{1}{2} \times 10 \times h$ A1 for 34.40954801…(ft) B1 for area of pentagon = 5 × (ft) = 172.0477401…(ft) B1 for area of dodecahedron = 12 × (ft) = 2064.572881… cm^2 A1 for 2065 cm^2 (oe)

1MA0/2H					
Question		**Working**	**Answer**	**Mark**	**Additional Guidance**
18. (Cont)		**OR** Pentagon split into 3 isos triangles, where 2 are equal. Area of 2 isos triangles $= 2(\frac{1}{2}10^2 \sin 108)$ = 95.10565163... $\frac{x}{\sin 72} = \frac{10}{\sin 36}$ x = 16.18033989... x^2 = 261.803399.. Area of 3rd isos triangle $= \frac{1}{2}$ (261.803399..)sin36 = 76.94208845..	2065 cm^2	9	**OR** B1 for 108° (and base angles 36°) B1 for base angles 72° (and 36°) M1 for finding equal sides of 3rd isos triangle: $\frac{x}{\sin 72} = \frac{10}{\sin 36}$ A1 for x = 16.18033989... M1 for area = $\frac{1}{2}x^2 \sin 36$ M1 for area = $2(\frac{1}{2}10^2 \sin 108)$ A1 for one of (76.94208845.. and 95.10565163...) B1 for area of dodecahedron A1 for 2065 cm^2 (oe)
					Total for Question: 9 marks

9.



14.