Question Number	Scheme	Marks
4. (a)	$P(W < 120) = P\left(Z < \frac{120-165}{35}\right)$	M1
	$= P(Z < -1.2857\ldots) = 1 - 0.9015$ <u>or</u> $1 - 0.9007285\ldots$	M1
	$= 0.09927\ldots$ = awrt **<u>0.0985~0.0994</u>**	A1
		(3)
(b)	e.g. $P(W > x) = \frac{1}{3}$ gives $\frac{x-165}{35} = \pm 0.43$ (calculator 0.430727…)	M1B1
	Limits 149.9245… to 180.0754… awrt **<u>150</u>** to **<u>180</u>**	A1, A1
		(4)
(c)	$P(W < 200 \mid W >$ "180") <u>or</u> $\frac{P("180" < W < 200)}{P(W > "180")}$ or $\frac{1}{3}$	M1
	$= \frac{0.8413(44739...) - \frac{2}{3}}{\frac{1}{3}}$	A1 (num)
	$= 0.52403\ldots$ **<u>(0.523~0.5264)</u>**	A1
		(3)
(d)	$\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}; \times 3!$	M1;M1
	$= \underline{\frac{2}{9}}$	A1
		(3)
		[13 marks]

	Notes
(a)	1st M1 for standardising with 120 (allow 210), 165 and 35. Accept $\pm$
	2nd M1 for attempting $1 - p$ [where $0.85 < p < 0.95$]
	A1 for awrt 0.0985~0.0994 (Correct ans only 3/3)
(b)	M1 for standardising with x (o.e.) 165 and 35 and setting equal to a z value, $0.4 < \lvert z \rvert < 0.5$ (Accept $\frac{165-x}{35} = \pm z$ where $0.4 < \lvert z \rvert < 0.5$)
	B1 for use of $z = 0.43$ or better We must see 0.43 or better.
	1st A1 for lower limit of awrt 150
	2nd A1 for upper limit of awrt 180
SC	A0A1 for two limits symmetrically placed about 165 provided M1 scored **NB**: correct answers with no working can score M1B0A1A1
(c)	M1 for a correct probability statement (either form) ft their 180 or a correct ratio
	1st A1 for a correct numerator (awrt 0.175)
	2nd A1 for an answer in the range awrt 0.523~0.5264 (use of 180 gives 0.5263869…)
(d)	1st M1 for $\left(\frac{1}{3}\right)^3$ (or equivalent)
	2nd M1 for $p \times 3!$ (or equivalent) where $0 < p < \frac{1}{6}$
	A1 for $\frac{2}{9}$ or any exact equivalent