Question Number	Scheme		Marks
8(a)	Let $X = L - M$	Let $X = L - M - 90$	
	$\mathrm{E}(X) = 100$	$\mathrm{E}(X) = 10$	M1
	$\mathrm{Var}(X) = 7^2 + 6^2$	$\mathrm{Var}(X) = 7^2 + 6^2$	M1
	$X \sim N(100, 85)$	$X \sim N(10, 85)$	A1
	$\mathrm{P}(X > 90) = \mathrm{P}\left(Z > \frac{90-100}{\sqrt{85}}\right)$	$\mathrm{P}(X > 0) = \mathrm{P}\left(Z > \frac{0-10}{\sqrt{85}}\right)$	dM1
	= 0.8599…(calc 0.860…)	awrt 0.86	A1 (5)
(b)	(Let $Y = L - 4S$)		
	$\mathrm{E}(Y) = 20$		B1
	$\mathrm{Var}(Y) = 7^2 + 16 \times \sigma^2$		M1
	$Y \sim \mathrm{N}(20, 49 + 16\sigma^2)$		A1
	$\mathrm{P}(Y > 0) = \mathrm{P}\left(Z > \frac{0 - '20'}{\sqrt{'49 + 16\sigma^2'}}\right)$		M1
	$\frac{0 - '20'}{\sqrt{'49 + 16\sigma^2'}} = -1.96$		M1B1
	$20^2 = 1.96^2\left(49 + 16\sigma^2\right)$		dM1
	$\sigma = 1.8561...$		A1cso (8)
			Total 13

	Notes	
8(a)	**M1**	Either 100 or 10
	M1	For addition of variances
	A1	N(100, 85) or N(10,85)
	dM1	Dependent on the first 2 M marks $\frac{90-100}{\sqrt{"85"}}$ or $\frac{0-10}{\sqrt{"85"}}$
(b)	**B1**	$\mathrm{E}(Y) = 20$
	M1	Use of $16 \times \mathrm{Var} + ...$
	A1ft	$\mathrm{N}('20', 49 + 16\sigma^2)$ (may be implied by its use)
	M1	M1 standardising using their mean, sd and zero
	M1	Putting standardisation equal to a z value where $\lvert z \rvert > 1.5$
	B1	–1.96 or better used in a standardisation equation with compatible signs
	dM1	Squaring (dependent upon 2nd and 3rd M1 marks)
	A1cso	awrt 1.86 (must come from correct working)

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