Question Number	Scheme	Marks
5. (a)	P($X < 37$) = $\mathrm{P}\left(Z < \frac{37-40}{2.4}\right) = \mathrm{P}(Z < -1.25)$	M1
	= 1 – 0.8944 ; = 0.105649… awrt **0.106**	M1; A1 (3)
(b)	P(one value is greater than 32) = $\sqrt{0.16}$ [=0.4]	M1
	$\frac{32-m}{2.4} = 0.2533$	M1 B1
	$m = 31.392...$ awrt **31.4**	A1 (4)
(c)	P($Y < 0$) = $\mathrm{P}\left(Z < \frac{0-4}{8}\right) = \mathrm{P}(Z < -0.5)$ [= 0.3085]	M1
	Let X be the number of negative values	
	P($X \geqslant 1$) = 1 – P($X = 0$) oe	M1
	= 1 – $(0.6915)^5$	M1
	= 0.84188… awrt **0.842**	A1 (4) **[11]**

	Notes
(a)	1st M1 standardising 37 (or 43) with 40 and 2.4 (allow ±) 2nd M1 for $1 - p$ (where $0.88 < p < 0.90$) Implied by correct answer. A1 for awrt 0.106 (calc. 0.105649…..)
(b)	1st M1 correct expression for one value > 32 (may be implied by sight of 0.2533… Allow any value between 0.25 and 0.26 inclusive) 2nd M1 standardising 32 with m and 2.4 and setting equal to z value $0.2 < \lvert z \rvert < 0.3$ B1 for $z = \pm 0.2533$ or better (calc gives 0.2533470931…..) used in a linear equation for m A1 awrt 31.4 or better **SC** [using 0.16]Allow M0M1 B0 A0 for $\frac{32-m}{2.4} = z$ where $0.99 \leqslant \lvert z \rvert < 1.04$
(c)	1st M1 standardising 0 with 4 and 8 (allow ±) or seeing 0.3085 or 0.6915 2nd M1 realising they need to find 1 – P($X = 0$) ie writing or using 1− P(no negative values)oe May be implied by $1 - p^5$ $0 < p < 1$ 3rd M1 use of $1 - p^5$ where p is $1 - "\text{their } \mathrm{P}\left(Z < \frac{0-4}{8}\right)"$ A1 awrt 0.842 (tables: 0.8418894… calculator: 0.84193233….) NB If they use Binomial ▪ and get 0.842 full marks. ▪ and get 0.125 then award M1M1M0A0 ▪ otherwise send to Review