Question	Scheme	
6(a)(i)	$\mathrm{P}(X > 508) = \mathrm{P}\left(Z > \frac{508-502}{3}\left[=2\right]\right)$	M1
	= 0.0228 awrt 0.0228	A1
		(2)
(ii)	$\mathrm{P}(496 < X < 508) = 1 - 2 \times "0.0228"$ or $"0.9772" - (1 - "0.9772")$	M1
	= 0.9544 awrt 0.954	A1ft
		(2)
(b)	$"0.0228"^2 \times (1 - "0.0228")^2 \times 6$	M1 dM1
	= 0.002978… (calc gives 0.002965…) awrt **0.00297** or awrt **0.00298**	A1
		(3)
(c)	$\frac{1038.51-1024}{\sigma} = 1.0364$	M1
	$\sigma = \frac{1038.51-1024}{1.0364} = 14.000..$ (calc 13.999…)*	A1*
		(2)
(d)(i)	$\pm\left(\frac{k-502}{3}\right)$ **and** $\pm\left(\frac{1024-2k}{14}\right)$	M1
	$\frac{k-502}{3} = \frac{1024-2k}{14}$ oe e.g. $14k - 7028 = 3072 - 6k$	M1
	$k = 505$	A1
(ii)	$\mathrm{P}(X > 505) = \mathrm{P}\left(Z > \frac{"505"-502}{3}\left[=1\right]\right)$	M1
	= 0.1587 awrt **0.159**	A1
		(5)
	Notes	**Total 14**
(a)(i)	M1 for standardising with 508, 502 and 3 allow ±	
	A1 awrt 0.0228 (dependent on M1 scored for standardising) . Answer must be in part (a)(i).	
(ii)	M1 ft their 0.0228	
	A1ft awrt 0.954 or from calculator 0.954499…. so allow 0.9545 Correct answer scores 2 out of 2. ft their part (a) i.e. 1 – 2 × "their (a)" provided 0 < "their (a)" < 0.5	
(b)	M1 For an expression in the form $p^2 \times (1-p)^2 \times A$ where A is an integer, $A \ldots 1$ and p is a probability Allow A written in alternative forms eg ${}^4C_2$	
	M1 dep on first M1 for $A = 6$ oe	
	A1 awrt 0.00297 or awrt 0.00298 (allow in standard form). Correct answer scores 3 out of 3.	
(c)	M1 an equation in the form $\frac{1038.51-1024}{\sigma} = z$ or $\frac{14.51}{\sigma} = z$ with 1.03,, $\lvert z \rvert$,, 1.04	
	A1* for a correct expression for σ with z = 1.0364 or better (calc 1.036433…) seen and awrt 14	
(d)(i)	M1 for both standardisations seen or used in an equation Allow use of their 14 from part (c)	
	M1 Correct equation with compatible signs - need not be simplified Allow use of their 14 from part(c)	
	A1 505 (allow awrt 505 coming from "their 14" used).	
(ii)	M1 for standardising with "505", 502 and 3 or with "1010", 1024 and 14 allow ±, ft their value of k may be implied by a correct answer	
	A1 awrt 0.159 Correct answer scores M1A1 in (d)(ii)	