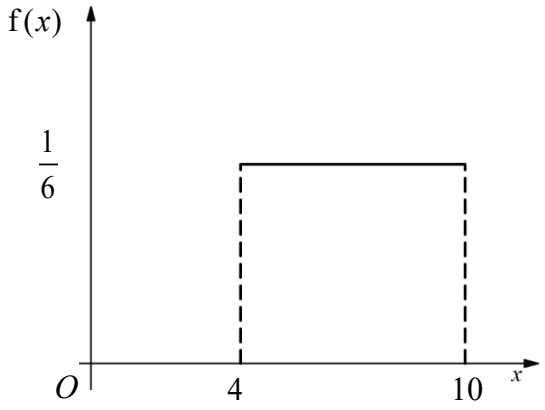
Question Number	Scheme	Marks
2(a)	$[\mathrm{F}(10)] = k \times 6 = 1 \Rightarrow k = \frac{1}{6}$ *	B1cso
		(1)
(b)	$[\mathrm{P}(X = 5) =]\ 0$	B1
		(1)
(c)	$[\mathrm{P}(5 < X < 7) =]\ \mathrm{F}(7) - \mathrm{F}(5)\ \left(= \frac{1}{6}(3-1)\right)$	M1
	$= \frac{1}{3}$	A1
		(2)
(d)	$\mathrm{f}(x) = \begin{cases} \frac{1}{6} & 4 \leqslant x \leqslant 10 \\ 0 & \text{otherwise} \end{cases}$	M1A1
		(2)
(e)		M1A1ft
		(2)
(f)	$\mathrm{E}(X)\left(= \frac{4+10}{2}\right) = 7$	B1
		(1)
(g)	$[\mathrm{Var}(X)] = \frac{(10-4)^2}{12} = 3$ **or** $[\mathrm{E}(X^2)] = \int_{[4]}^{[10]} \frac{x^2}{6}\,\mathrm{d}x$ **or** $[\mathrm{E}(2X^2-1)] = \int_{[4]}^{[10]} \frac{2x^2-1}{6}\,\mathrm{d}x$	M1
	$\mathrm{E}(2X^2-1) = 2 \times \left("3"+"7"^2\right) - 1$ **or** $2\left[\frac{x^3}{18}\right]_4^{10} - 1 = 2\left(\frac{1000}{18} - \frac{64}{18}\right) - 1$	M1
	$= 103$ $= 103$	A1
		(3)
	Notes	**Total 12**
(a)	**B1*** cso for substituting $x = 10$ into $\mathrm{F}(x)$, setting equal to 1 and rearranging to achieve the given answer. Alternatively, substituting $x = 10$ and $k = \frac{1}{6}$, and achieves an answer of 1 but must state a conclusion confirming that $k = \frac{1}{6}$	

(b)	**B1**	cao
(c)	**M1**	for sight or use of $\mathrm{F}(7)-\mathrm{F}(5)$
	A1	$\frac{1}{3}$ or exact equivalent. (Answer coming from incorrect working (e.g. substituting 6 and 4 o.e. is M0A0)
(d)	**M1**	for $\mathrm{f}(x)=\frac{1}{6}$ with or without the interval
	A1	fully correct with both lines and correct intervals (o.e)
(e)	**M1**	for a horizontal line \ rectangle drawn in the first quadrant
	A1ft	fully correct with 4, 10 and "1/6" labelled (condone missing vertical lines at 4 and 10 and axes labels)
(f)	**B1**	cao
(g)	**M1**	attempts to find Var(X) or attempts to integrate $x^2\times\mathrm{f}(x)$. (Ignore limits and labelling) May be seen as part of $\int_{[4]}^{[10]}\frac{2x^2-1}{6}\,\mathrm{d}x$ Condone omission of dx
	M1	for a full attempt to find $\mathrm{E}(2X^2-1)$ (Implied by $2\times(\text{"52"})-1$). Follow through their $\mathrm{E}(X^2)$ evaluated, even if labelled as $\mathrm{Var}(X)$.
	A1	Cao (Working must be seen)