Question Number	Scheme	Marks
2(a)	F(5) = 1 so $[k(5 + 3) = 1]$ or F(5) – F(-3) = 1 so $[k(5 + 3) - k(-3 + 3) = 1]$	M1
	$8k = 1$ so $k = \frac{1}{8}$*	A1*
		(2)
(b)(i)	$[\,P(X > 2) =]1 - F(2) = 1 - \frac{1}{8}(2+3)$ **or** $\int_{[2]}^{[5]} \frac{1}{8}\,dx = \left[\frac{x}{8}\right]_{[2]}^{[5]}$ or 1 – (F(2) – F(-3))	M1
	$= \frac{3}{8}$	A1
(ii)	$[P(X = 5) =]$ 0	B1
		(3)
(c)	$\left[\frac{d}{dx}F(x)\right] = \frac{d}{dx}\left[\frac{1}{8}(x+3)\right] = \frac{1}{8}$	M1
	$f(x) = \begin{cases} \frac{1}{8} & -3 \leqslant x \leqslant 5 \\ 0 & \text{otherwise} \end{cases}$	A1 A1
		(3)
(d)	[Continuous] uniform	B1
		(1)
(e)(i)	$E(X) = \frac{-3+5}{2} = 1$	B1
(ii)	$[\text{Var}(X)] = \frac{(5+3)^2}{12}$ **or** $[\text{Var(X)}\,] = \left[\frac{x^3}{3}\text{ "f}(x)\text{"}\right]_{-3}^{5} - (\text{"1"})^2$	M1
	$\text{Var}(X) = \frac{16}{3}$	A1
		(3)

	Notes	Total 12
(a)	**M1**	For writing or using F(5) = 1 **or** F(5) – F(-3) = 1 **or** substituting $x = 5$ **and** $k = \frac{1}{8}$ into F(x) and showing it equals 1 .
	A1*	Fully correct solution with at least $8k = 1$ seen then leading to a statement that $k = \frac{1}{8}$
(b)(i)	**M1**	For using 1 – F(2) / 1 – (F(2) – F(-3)) or $\int_{[2]}^{[5]} \frac{1}{8}\,dx = \left[\frac{x}{8}\right]_{[2]}^{[5]}$ (no limits needed)
	A1	$\frac{3}{8}$ or exact equivalent
(ii)	**B1**	Cao
(c)	**M1**	Attempt to differentiate given F(x) , at least one . (Can be implied by 1st A1)
	A1	For $f(x) = \frac{1}{8}$ or $f(x) = k$ with the correct interval stated (condone < , but must be consistent)
	A1	Fully correct (fully correct distribution (including the f (x)) implies 3/3)) (Accept if left in k)

(d)	**B1**	Allow rectangular (distribution). (Allow $X \sim U(-3,5)$ or $X \sim Uniform(-3,5)$) Discrete – B0
(e)(i)	**B1**	cao
(ii)	**M1**	use of $\frac{(\beta-\alpha)^2}{12}$ or $\left[\frac{x^3}{3}\text{ "f}(x)\text{"}\right]_{-3}^{5} - (\text{"1"})^2$, (follow through a constant f(x))
	A1	$\frac{16}{3}$ or exact equivalent (Correct answer only 2/2)