Question Number	Scheme	Marks
3(a)	$\frac{3}{4}$	B1
		(1)
(b)	$\mathrm{E}(T)=\dfrac{50+2k}{2}[=25+k]$	B1
	$\mathrm{Var}(T)=\dfrac{(4k)^2}{12}\left[=\dfrac{4k^2}{3}\right]$	B1
	$\mathrm{E}\left(T^2\right)=\dfrac{4k^2}{3}+\left(25+k\right)^2$	M1
	$\dfrac{7k^2}{3}+625+50k=918.76$	
	$7k^2+150k-881.28=0$	dM1
	$k=\frac{-150\pm\sqrt{150^2+4\times7\times881.28}}{14}$	dM1
	$k=4.8$ oe only	A1
		(6)
(c)	$\mathrm{P}(T<25)=\frac{1}{4}$	B1
	B(50, 0.25)	
	$\mathrm{P}\left(X\geq20\right)=1-\mathrm{P}\left(X\leq19\right)$	M1
	$= 1 - 0.9861$	
	$= 0.0139$ awrt 0.0139	A1
		(3)
		Total 10

Notes

(a)	**B1**	0.75 oe
(b)	**B1**	$\mathrm{E}(T)=\dfrac{50+2k}{2}[=25+k]$ allow equivalent unsimplified expressions
	B1	$\mathrm{Var}(T)=\dfrac{(4k)^2}{12}\left[=\dfrac{4k^2}{3}\right]$ allow equivalent unsimplified expressions
	M1	Using $\mathrm{Var}(T) + [\mathrm{E}(T)]^2$ oe e.g. $"\frac{4k^2}{3}" = \mathrm{E}(T^2) - "(25+k)"^2$
	dM1	Dependent on previous M being awarded. Substituting $\mathrm{E}(T^2) = 918.76$, multiplying out and combining like terms leading to a 3TQ = 0
	dM1	Dependent on previous M being awarded. A correct method for solving their quadratic – use of formula (allow one slip), completing the square, factorising.
	A1	Must have 4.8 oe on its own as answer (must reject $k = -26.2$ if seen) 4.8 on its own scores 6 out of 6.
	ALT	**For first 4 marks in (b)** $\int_{25-k}^{25+3k} t^2(\frac{1}{4k})\mathrm{d}t = \left[\dfrac{t^3}{12k}\right]_{25-k}^{25+3k} \rightarrow \dfrac{(25+3k)^3}{12k}-\dfrac{(25-k)^3}{12k}=918.76$ B2 for correct integral (ignore limits), M1 for attempt at integration $t^2 \rightarrow t^3$, dM1 for use of limits and = 918.76, then follow main scheme
(c)	**B1**	0.25
	M1	Writing or using $1-\mathrm{P}\left(X\leq19\right)$
	A1	awrt 0.0139