Question Number	Scheme	Marks
7(a)	$\frac{1}{2}k(2k-3)=1$	M1
	$k^2-\frac{3}{2}k-1=0$ (o.e) so $(k-2)(2k+1)=0 \Rightarrow k=2$	A1*
		(2)
(b)	[Mode] = 4	B1
		(1)
(c)	Gradient = 2 so $y=2x+c$ Goes through (3, 0) so $c=-6$	M1
	$f(x)=\begin{cases}2x-6 & 3\leqslant x\leqslant 4\\ 0 & \text{otherwise}\end{cases}$	dM1 A1
		(3)
(d)	$E\left(X^2\right)=\int_{[3]}^{[4]}x^2\left(2x-6\right)dx$	M1
	$=\left[\frac{1}{2}x^4-2x^3\right]_3^4$	dM1
	$=\left(128-128\right)-\left(\frac{81}{2}-54\right)\left[=\frac{27}{2}\right]$	M1
	$\text{Var}(X)="\frac{27}{2}"-\left(\frac{11}{3}\right)^2$	M1
	$=\frac{1}{18}$	A1
		(5)

	Notes	Total 11
(a)	**M1**	for use of area = 1 or using k=2 and showing the area = 1
	A1	for a correct three term quadratic = 0 or a correct method to find k e.g. $(k-2)(2k+1)=0$ **and** a statement that k = 2 (must reject k=-0.5 if stated). If they have shown by verification that the area = 1, we also need a statement k = 2. Correct answer with no incorrect working seen (2/2).
(b)	**B1**	4 (Condone 2k)
(c)	**M1**	for either $y=2x+c$ or $y=ax-6$ with $a>1$ or $y-2=m(x-4)$, $m>1$
	dM1	for their f(x) = 2x – 6 associated with the correct range, dep on 1st M1 (condone < but must be consistent)
	A1	fully correct (Correct answer 3/3)
(d)	**M1**	for $\int x^2 f(x)\,dx$ (Condone missing dx or use of another letter), Ignore limits. Using their f(x) but must be an equation of a line. We must see f(x) in the integral so just seeing $\int x^2\,dx$ - M0
	dM1	Dep of 1st M1, for an integration using their f(x) (at least 1 term $x^n \rightarrow x^{n+1}$). Condone upper limit as 2k
	M1	for correct substitution of limits seen (3 and 4 (2k)) into their integration. Check unseen substitution for a single term.
	M1	for a correct method to find the variance. ft their 13.5 Var(X)<0 or $E\left(X^2\right)<0$ is M0
	A1	$\frac{1}{18}$ or exact equivalent