Question Number	Scheme	Marks
5. (a)(i)	$\frac{(b-2a)-a}{b-a}=\frac{1}{3}$ $3(b-3a)=(b-a)$ $b=4a$ $\mathrm{E}(X)=\frac{a+4a}{2}=\frac{5a}{2}$* or $\frac{b-(b-2a)}{b-a}=\frac{2}{3}$ $6a=2(b-a)$ $b=4a$ $\mathrm{E}(X)=\frac{a+4a}{2}=\frac{5a}{2}$* oe	M1 M1A1cso (3)
(ii)	**[**[P($X > b-4a$) = P($X > 0$) =] 1	B1 (1)
(b)(i)	$\frac{(c-3)^2}{12}=3c-9$ $c^2-42c+117=0 \rightarrow (c-3)(c-39)=0$ **$\underline{c = 39}$**	M1 M1 A1 (3)
(ii)	P($2Y-7<20-Y$) = P($Y<9$) $\frac{9-3}{'39'-3}=\frac{1}{6}$ **awrt 0.167**	M1 A1ft A1 (3)
(iii)	$\mathrm{E}(Y^2)$ = Var(Y) + [E(Y)]^2 = $(3('39')-9)+\left(\frac{'39'+3}{2}\right)^2$ $\mathrm{E}(Y^2)$ = **$\underline{549}$**	M1 A1ft A1 (3) **[13 marks]**
	Notes	
(a)(i)	1st M1 for a correct probability equation = $\frac{1}{3}$ (or a correct probability equation = $\frac{2}{3}$)in terms of a and b 2nd M1 for use of E(X) = $\frac{a+'4a'}{2}$ oe A1cso correct solution with no errors seen.	
(b)(i)	1st M1 for $\frac{(c-3)^2}{12}=3c-9$ 2nd M1 for rearranging correctly to form 3TQ = 0 and attempt to solve or $\frac{c-3}{12}=3$ oe For attempt at factorising it must give two of the terms when multiplied out For using the formula allow 1 slip if the correct formula is written down otherwise no errors For completing the square allow one sign error. A1 If more than one value is given and c = 39 is not clearly selected then A0. Allow [3,39]	
(ii)	M1 for rearranging to (or using) P($Y < 9$) 1st A1ft for a correct probability expression ft their '39'. If (i) is incorrect we must see a correct expression eg $\frac{9-3}{"39"-3}$ or $\frac{6}{"36"}$ to ft	
(iii)	M1 for writing or using $\mathrm{E}(Y^2)=\mathrm{Var}(Y)+[\mathrm{E}(Y)]^2$ (must be $\mathrm{E}(Y^2)=$) $\int_3^{'39'} \frac{1}{'39'-3} y^2 \mathrm{d}y$ with $y^2 \rightarrow y^3$ condone different letter. If c is incorrect, they must show where Var(Y) and E(Y) come from. A1ft correct (follow through) expression for $\mathrm{E}(Y^2)$ allow $\frac{1}{'39'-3}\left[\frac{y^3}{3}\right]_3^{'39'}$	