Question Number	Scheme	Marks
4. (a)	$\frac{2}{5}$	B1 (1)
(b)	$\mathrm{E}(W)=3$ $\mathrm{E}(5-2W)=5-2\mathrm{E}(W)$ $\mathrm{E}(X)=-1$	B1 M1 A1 (3)
(c)	$\mathrm{P}(X<W)=\mathrm{P}(5-2W<W)=\mathrm{P}(W>\frac{5}{3})$ or $\mathrm{P}(W\geqslant 2)$ $=\frac{4}{5}$	M1 A1 (2)
(d)(i)	$[y]$: 1, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$ $[p]$: $\frac{1}{5}$, $\frac{1}{5}$, $\frac{1}{5}$, $\frac{1}{5}$, $\frac{1}{5}$	B1
(ii)	$\mathrm{E}(Y)=\frac{1}{5}\left(1+\frac{1}{2}...+\frac{1}{5}\right)$ or $\frac{1}{5}+\frac{1}{10}+\frac{1}{15}+\frac{1}{20}+\frac{1}{25}$ $\left[=\frac{137}{300}=0.4566...\right]$ $\mathrm{E}(Y^2)=\frac{1}{5}\left(1^2+\left(\frac{1}{2}\right)^2+...+\left(\frac{1}{5}\right)^2\right)$ or $\frac{1}{5}+\frac{1}{20}+\frac{1}{45}+\frac{1}{80}+\frac{1}{125}$ $\left[=\frac{5269}{18000}=0.2927...\right]$ $\mathrm{Var}(Y)=\text{'}0.2927...\text{'}-(\text{'}0.4566...\text{'})^2$ awrt **0.0842**	M1 M1 M1 A1 (5)
(e)	$\mathrm{Var}(2-3Y)=(-3)^2\mathrm{Var}(Y)$ awrt **0.758**	M1 A1ft (2)
	Notes	**[13]**
(a)	B1 oe	
(b)	B1 sight of $\mathrm{E}(W)=3$ or the x values 3, 1, −1, −3, −5 (they may be added) M1 use of $\mathrm{E}(5-2W)=5-2\mathrm{E}(W)$ or $\frac{1}{5}(3+1+...+-5)$ Condone use of X instead of W A1 cao and labelled E(X)	
(c)	M1 for identifying $W>\frac{5}{3}$ or $W\geqslant 2$ eg $1-\mathrm{P}(W=1)\geqslant 2$ or $1-\mathrm{P}(W\leqslant 1)\geqslant 2$ A1 oe	
(d)(i)	B1 Correct distribution (probabilities may be implied by correct use). May be seen in any part	
(ii)	M1 attempt at expression for E(Y) using their values of y and p (at least 2 terms seen) or awrt 0.457 (0.45 if have 0.3 rather than 1/3) Condone incorrect labelling M1 attempt at expression for $\mathrm{E}(Y^2)$ using their values of y and p (at least 2 terms seen) or awrt 0.293 (0.2885 if have 0.3 rather than 1/3) Condone incorrect labelling M1 For use of $\text{"E}(Y^2)\text{"}-(\text{"E}(Y)\text{"})^2$ ft their values for E(Y^2) and E(Y) A1 awrt 0.0842 or $\frac{947}{11250}$	
(e)	M1 for use of $(-3)^2\mathrm{Var}(Y)$ with their $\mathrm{Var}(Y)>0$ condone $(3)^2\mathrm{Var}(Y)$ A1ft $\frac{947}{1250}$ or 9 × "their part (d) > 0" evaluated correctly to 3sf or exact fraction	