d) $E[Y|X=0.5] = (-2)(0) + (-1)(\frac{1}{3}) + (1)(\frac{2}{3})$

$= \frac{1}{3}$

∴ The average value of Y when fixed at $X=0.5$ is $1/3$.

e)

$E(X) = \frac{3}{8}$ $\quad Var(X) = \frac{11}{64}$

$E(Y) = \frac{1}{8}$ $\quad Var(Y) = \frac{87}{64}$

$E(XY) = (-1)(-2)(\frac{1}{8}) + \frac{1}{8} + (-1)(0.5)(\frac{1}{4}) + \frac{1}{4}$

$= \frac{1}{4} + \frac{1}{8} - \frac{1}{8} + \frac{1}{4}$

$= \frac{1}{2}$

$Cov(X,Y) = E(XY) - E(X)E(Y)$

$= \frac{1}{2} - (\frac{3}{8})(\frac{1}{8})$

$= \frac{32}{64} - \frac{3}{64}$

$= \frac{29}{64}$

$\rho_{X,Y} = \frac{Cov(X,Y)}{\sqrt{Var(X)Var(Y)}}$

$= \frac{\frac{29}{64}}{\sqrt{(\frac{11}{64})(\frac{87}{64})}}$

$= \frac{29}{64} \cdot \frac{64}{\sqrt{957}}$

$= \frac{29}{\sqrt{957}}$

$= \frac{29\sqrt{957}}{957}$