

$$1. P(X=0) = .10 + .15 + .10 = .35$$

$$P(X=1) = .10 + .05 + .05 = .20$$

$$P(X=2) = .15 + .20 + .10 = .45$$

$$P(Y=1) = .10 + .10 + .15 = .35$$

$$P(Y=2) = .15 + .05 + .20 = .40$$

$$P(Y=3) = .10 + .05 + .10 = .25$$

$$E(X) = .35 \times 0 + .20 \times 1 + .45 \times 2 = 1.55$$

$$E(Y) = .35 \times 1 + .40 \times 2 + .25 \times 3 = 1.9$$

$$\text{Var}(X) = .35(0-1.55)^2 + .20(1-1.55)^2 + .45(2-1.55)^2 = 1.8475$$

$$\text{Var}(Y) = .35(1-1.9)^2 + .40(2-1.9)^2 + .25(3-1.9)^2 = 1.07$$

$$b) E(Y|X=0) = 1 \times P(Y=1|X=0) + 2 \times P(Y=2|X=0) + 3 \times P(Y=3|X=0)$$

$$P(Y=1|X=0) = \frac{P(Y=1, X=0)}{P(X=0)} = \frac{.10}{.35}$$

$$P(Y=2|X=0) = \frac{P(Y=2, X=0)}{P(X=0)} = \frac{.15}{.35}$$

$$P(Y=3|X=0) = \frac{P(Y=3, X=0)}{P(X=0)} = \frac{.10}{.35}$$

$$E(Y|X=0) = 1 \times \frac{.10}{.35} + 2 \times \frac{.15}{.35} + 3 \times \frac{.10}{.35} \\ = \frac{.10}{.35} + \frac{.30}{.35} + \frac{.30}{.35} = \frac{.70}{.35}$$