

2.6

a)  $E(Y)$  - From Marginal dist of  $Y$ .

$$P(Y=0) = .05 \quad P(Y=1) = .95$$

$$E(Y) = 0(.05) + 1(.95) = .95$$

(b)  $P_a(Y=0) = 1 - P_a(Y=1) = .05$

(c)  $E(Y|X=1)$  and  $E(Y|X=0)$

you need the conditional dist. of  $Y|X$ .

$$P(Y=0|X=0) = \frac{.045}{.754} = .0597$$

$$P(Y=1|X=1) = \frac{.005}{.246} = .0203$$

$$P(Y=1|X=0) = \frac{.709}{.754} = .9403$$

$$P(Y=1|X=1) = \frac{.241}{.246} = .9797$$

$$E(Y|X=1) = 0(.0203) + 1(.9797) = .9797$$

$$E(Y|X=0) = 0(.0597) + 1(.9403) = .9403$$

College grads

$$d) 1 - E(Y|X=1) = 1 - .9797 = .0203$$

Non College

$$1 - E(Y|X=0) = 1 - .9403 = .0597$$

$$e) P(X=1 | Y=0) = \frac{P(X=1, Y=0)}{P(Y=0)}$$
$$= \frac{.005}{.050} = .10$$

$$P(X=0 | Y=0) = \frac{P(X=0, Y=0)}{P(Y=0)} = .9$$

f) No.

$$Pr(Y=0 | X=0) = .0597 \neq P(Y=0) = .05$$