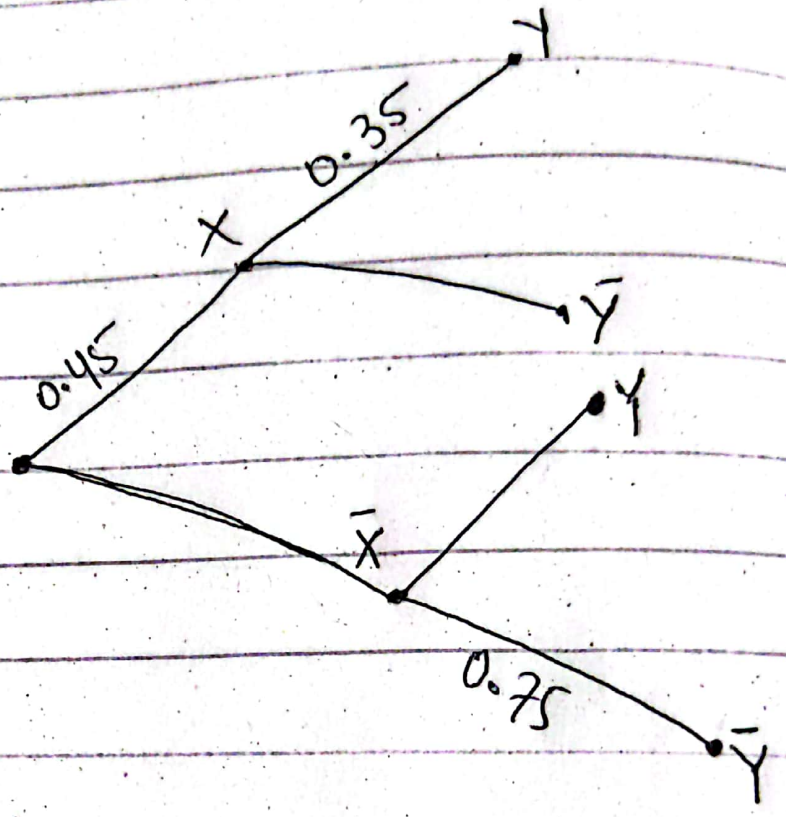
27/01/2022

Probability Assignment



Solution:-

a) P(Y) (b) P(X|Y) (c) P(X|$\bar{Y}$)

$P(X) = 0.45$

$P(Y/X) = 0.35$

$\bar{X} = 1 - 0.45$

$\bar{X} = 0.55$

$\bar{Y}_1 = 1 - 0.35 = 0.65$

$Y = 1 - 0.75 = 0.25$

$\bar{Y}_2 = 0.75$

(a) $P(Y) = P(X \cap Y) + P(\bar{X} \cap Y)$

$= (0.35 \times 0.45) + (0.55 \times 0.25)$

$= \boxed{0.295}$

(b) $P(X|Y) = \dfrac{P(X \cap Y)}{P(Y)}$

$\Rightarrow \dfrac{P(X) \cdot P(Y)}{P(Y)}$

$\Rightarrow \dfrac{(0.45)(0.35)}{0.295}$

$\boxed{P(X|Y) = 0.534}$

(c) $P(X|\bar{Y}) = \dfrac{P(X \cap Y')}{P(Y')}$

$\Rightarrow \dfrac{0.45 \times 0.65}{(0.45)(0.65) + (0.55)(0.75)}$

$\Rightarrow \dfrac{0.2925}{0.705} = 0.415$

$P(X\bar{Y}) = 1 - 0.415$

$= \boxed{0.585}$ Ans