hwa0026-0027

*

(Dated: February 9, 2010)

0026-1:
$Pr[A\|B] = \frac{Pr[A\&B]}{Pr[B]} \rightarrow Pr[A\&B] = Pr[B]Pr[A\|B] = 0.2 \times 0.9 = 0.18$

$Pr[B\|A] = \frac{Pr[A\&B]}{Pr[A]} = \frac{0.18}{0.8} = 0.225$

0026-2: **a**: There are infinite many pairs. one of such X,Y is as follows:
$X(\omega) = 1, 0 < \omega < 0.8$
$X(\omega) = 0, 0.8 < \omega < 1$
and
$Y(\omega) = 0, 0 < \omega < 0.62$
$Y(\omega) = 2, 0.62 < \omega < 0.82$
$Y(\omega) = 0, 0.82 < \omega < 1$
b: 0.225. No matter which pair of X,Y one chooses, the answer will be the same, following 0026-1.

0026-3: **a**: $\frac{Pr[A]}{Pr[notA]} = Odds[A] = 3 \rightarrow Pr[A] = 0.75, Pr[notA] = 0.25$

$Pr[A\&B] = Pr[B\|A]Pr[A] = 0.2 \times 0.75 = 0.15$

$Pr[notA\&B] = Pr[B\|notA]Pr[notA] = 0.6 \times 0.25 = 0.15$

$Odds[A\|B] = \frac{Pr[A\|B]}{Pr[notA\|B]} = \frac{Pr[A\&B]}{Pr[notA\&B]} = 1$

b : $Pr[A\&B\&C] = Pr[C\|B\&A]Pr[B\&A] = 0.8 \times 0.15 = 0.12$

$Pr[notA\&B\&C] = Pr[C\|B\&notA]Pr[B\&notA] = 0.1 \times 0.15 = 0.015$

$Odds[A\|B\&C] = \frac{Pr[A\|B\&C]}{Pr[notA\|B\&C]} = \frac{Pr[A\&B\&C]}{Pr[notA\&B\&C]} = 0.12/0.015 = 8$

0027-1: E[X]=4×$0.65 + 10 \times 0.35 = 6.1$

$Var[X] = E(X^2) - (E(X))^2 = 4^2 \times 0.65 + 10^2 \times 0.35 - 6.1^2 = 8.19$

$SD[X] = \sqrt{Var[X]} = \sqrt{8.19}$

0027-2: **a**: Pr[(Y=3)$\|(X = 4)] = \frac{Pr[(Y=3)\&(X=4)]}{Pr[X=4]} = 0.3/0.65 = 6/13$

b : $E[Y\|(X = 4)] = 7 \times Pr[Y = 7\|X = 4] + 3 \times Pr[Y = 3\|X = 4] = 7 \times \frac{0.36}{0.65} + 3 \times \frac{6}{13} = 5.15$

*Electronic address: `wang1591@umn.edu`