

H.W 2

1

VAZGEN TAPEVOSYAN

a. $\frac{20}{100} = \frac{1}{5} = 0.2$

b. As we already took one defective the probability of second selected chip will be $\frac{19}{99} \approx 0.19$

c. $\frac{20}{100} \cdot \frac{19}{99} = 0.03838$

2. $P(A|B) = 0.2$ $P(A|B') = 0.3$ $P(B) = 0.8$
 $P(A) = ?$

$$P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{P(A \cap B)}{0.8} = 0.2 \Rightarrow P(A \cap B) = 0.16$$

$$P(A|B') = \frac{P(A \cap B')}{P(B')} = \frac{P(A \cap B')}{0.2} = 0.3 \Rightarrow P(A \cap B') = 0.06$$

$$P(A) = P(A \cap B) + P(A \cap B') = 0.22 //$$



3.

$$a. {}_8P_3 = \frac{8!}{(8-3)!} = \frac{8!}{5!} = \underline{\underline{336}}$$

$$b. {}_{30}C_6 = \frac{30!}{24! 6!} = \underline{\underline{593775}}$$

$$c. {}_{12}C_2 \cdot {}_{10}C_2 \cdot {}_8C_2 = \underline{\underline{83160}}$$

4. a) $P(A_1) = 0.65$ $P(A_2) = 0.35$

$$P(B|A_1) = 0.3 \quad P(B|A_2) = 0.6$$

$$P(B|A_2) = \frac{P(B \cap A_2)}{P(A_2)} = 0.6$$

$$\frac{P(B \cap A_2)}{0.35} = 0.6 \Rightarrow P(B \cap A_2) = \underline{\underline{0.21}}$$



b) $P(B) = ?$

we have $P(B \cap A_2)$

we need find $P(B \cap A_1)$

$$P(B|A_1) = \frac{P(B \cap A_1)}{P(A_1)} = 0.3 \quad \frac{P(B \cap A_1)}{0.65} = 0.3$$

$$\Rightarrow P(B \cap A_1) = 0.195$$

Now apply total Prob rule

$$P(B) = P(B \cap A_1) + P(B \cap A_2) = 0.195 + 0.21 = 0.405$$

c) $P(A_1|B) = ?$

Let's apply Bayes rule

$$P(A_1|B) = \frac{P(B|A_1) \cdot P(A_1)}{P(B)} = \frac{0.3 \cdot 0.65}{0.405} = 0.481$$

