3D #4

a) $P(A \cup B) = P(A) + P(B) - \cancel{P(A \cap B)}^{0}$

$= \frac{1}{3} + \frac{1}{4} = \frac{7}{12}$

b) $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} = \frac{35}{60} + \frac{12}{60} = \frac{47}{60}$

c) $P(A \cup B \cup C)' = 1 - \frac{47}{60} = \frac{13}{60}$

The Product Rule for Independent Events

If A and B are independent,

then $P(A \cap B) = P(A) \cdot P(B)$

EX

A marble is drawn from each urn.

a) $P(\text{both are red}) = \underbrace{\frac{3}{5} \cdot \frac{1}{5}}_{R1 \text{ and } R2 \text{ are independent}} = \frac{3}{25}$

(b) $P(\text{2 different colors})$

$$P(R_1 \cap W_2) = \frac{3}{5} \cdot \frac{4}{5} = \frac{12}{25}$$

$$P(W_1 \cap R_2) = \frac{2}{5} \cdot \frac{1}{5} = \frac{2}{25}$$

$R_1 \cap W_2$ and $W_1 \cap R_2$ are mutually exclusive.

$$P\left((R_1 \cap W_2) \cup (W_1 \cap R_2)\right) = \frac{12}{25} + \frac{2}{25} = \frac{14}{25}$$

(c) $P(\text{at least 1 white})$

$$P(W_1 \cap R_2) + P(R_1 \cap W_2) + P(W_1 \cap W_2)$$

$$1 - P(R_1 \cap R_2)$$

$$= 1 - \frac{3}{5} \cdot \frac{1}{5} = 1 - \frac{3}{25} = \frac{22}{25}$$

3F #9. $P(E') = 0.6$

$P(F) = 0.6$

$P(E \cap F) = 0.24$

(a) $P(E) = 0.4$

(b) $P(E \cap F) = 0.24$

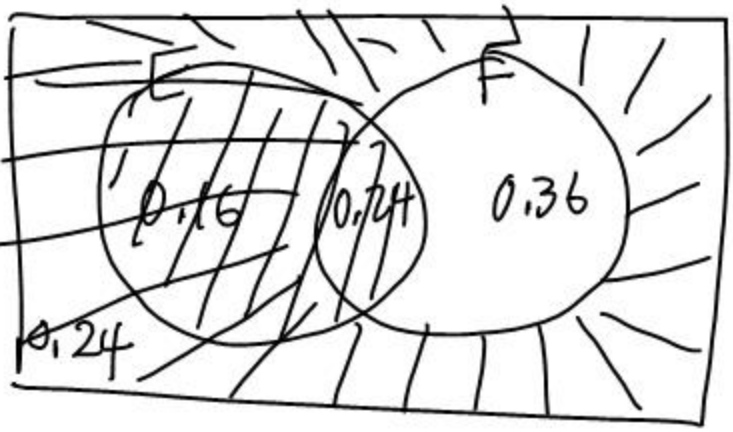
$P(E) \cdot P(F) = (0.4)(0.6) = 0.24$

$P(E \cap F) = P(E) \cdot P(F) \Rightarrow$ E and F are independent.

(c) $P(E \cap F) = 0.24 \neq 0 \Rightarrow$ E and F are not mutually exclusive.

(d) $P(E \cup F') = 1 - 0.36 = 0.64$

0.16
0.24
0.36
0.76



HW 3F
#1-3, 5, 8, 12