

1. $P(E \text{ AND } F) = 0.5$

$$P(E) = 0.7$$

$$P(F|E) = ?$$

$$P(F|E) = \frac{P(E \text{ AND } F)}{P(E)}$$

$$P(F|E) = \frac{0.5}{0.7}$$

$$= \boxed{0.7143}$$

2. $N(E \text{ AND } F) = 300$

$$N(E) = 800$$

$$P(F|E) = ?$$

$$P(F|E) = \frac{N(E \text{ AND } F)}{N(E)}$$

$$= \frac{300}{800}$$

$$= \boxed{0.375}$$

3. $P(E) = 0.7$

$$P(F|E) = 0.3$$

$$P(E \text{ AND } F) = ?$$

$$P(F|E) = \frac{P(E \text{ AND } F)}{P(E)}$$

$$0.3 = \frac{P(E \text{ AND } F)}{0.7}$$

$$0.3(0.7) = P(E \text{ AND } F)$$

$$\boxed{0.21} = P(E \text{ AND } F)$$

4. $P(\overset{\text{"F"}}{\text{FORGETFUL}} | \overset{\text{"E"}}{\text{OLD}}) = ?$

$$P(\overset{\text{"E"}}{\text{OLD}}) = .12$$

$$P(\overset{\text{"E"}}{\text{OLD}} \text{ AND } \overset{\text{"F"}}{\text{FORGETFUL}}) = .08$$

$$P(F|E) = \frac{P(E \text{ AND } F)}{P(E)}$$

$$P(\text{FORGETFUL} | \text{OLD}) = \frac{P(\text{OLD AND FORGETFUL})}{P(\text{OLD})}$$

$$= \frac{.08}{.12}$$

$$= \boxed{0.6667}$$

5. $P(\overset{\text{"F"}}{\text{GHOSTS}} | \overset{\text{"E"}}{\text{ALIENS}}) = .35$ $P(F|E) = 0.35$

$$P(\overset{\text{"E"}}{\text{ALIENS}} \text{ AND } \overset{\text{"F"}}{\text{GHOSTS}}) = .27$$

$$P(E \text{ AND } F) = 0.27$$

$$P(\overset{\text{"E"}}{\text{ALIENS}}) = ?$$

$$P(E) = ?$$

$$P(F|E) = \frac{P(E \text{ AND } F)}{P(E)}$$

$$0.35 = \frac{0.27}{P(E)}$$

$$0.35 P(E) = 0.27$$

$$P(E) = \frac{0.27}{0.35}$$

$$P(E) = \boxed{0.7714}$$