

Math 107. Homework #3. Solutions.

$$5.60 \quad P(T|G) = \frac{P(T \cap G)}{P(G)} = \frac{0.75}{0.80} \sim 0.94.$$

$$5.66 \quad (a) \frac{7}{60}; \quad (b) \frac{3/60}{18/60} = \frac{1}{6}; \quad (c) \frac{19/60}{(19+23)/60} = \frac{19}{42}.$$

$$5.68 \quad 0.50 \cdot 0.60 = 0.30.$$

$$5.77 \quad (a) \frac{16}{30} \cdot \frac{16}{30} = \frac{64}{225} \sim 0.284; \quad (b) \frac{16}{30} \cdot \frac{15}{29} = \frac{8}{29} \sim 0.275.$$

$$5.86 \quad P(A|M) = \frac{0.50 \cdot 0.01}{0.50 \cdot 0.01 + 0.30 \cdot 0.03 + 0.20 \cdot 0.05} = \frac{0.005}{0.024} \sim 0.2083;$$

$$P(B|M) = \frac{0.30 \cdot 0.03}{0.024} \sim 0.3750; \quad P(C|M) = \frac{0.20 \cdot 0.05}{0.024} \sim 0.4167.$$

5.88 Let A be the event that a lateness is attributed by the manager to an automobile problem, and let B denote the event that the lateness is indeed caused by an automobile problem. Then $P(B) = 0.03$, $P(A|B) = 0.80$, and $P(A|B') = 0.05$. Consequently,

$$P(B|A) = \frac{0.03 \cdot 0.80}{0.03 \cdot 0.80 + 0.97 \cdot 0.05} = \frac{0.024}{0.0725} \sim 0.331.$$

5.92 Let F be the event that a mistake is found in the order, and K , L , M , and N denote the events that the order was filled by the respective employees. Then,

$$P(K|F) = \frac{0.2 \cdot 0.01}{0.2 \cdot 0.01 + 0.4 \cdot 0.04 + 0.3 \cdot 0.02 + 0.1 \cdot 0.06} = \frac{0.002}{0.030} = \frac{1}{15};$$

$$P(L|F) = \frac{0.4 \cdot 0.04}{0.030} = \frac{0.016}{0.030} = \frac{8}{15};$$

$$P(M|F) = \frac{0.3 \cdot 0.02}{0.030} = \frac{0.006}{0.030} = \frac{3}{15} = \frac{1}{5};$$

$$P(N|F) = \frac{0.1 \cdot 0.06}{0.030} = \frac{0.006}{0.030} = \frac{3}{15} = \frac{1}{5};$$