STAT 3631/5631 Homework

Applied Statistics and Probability for Engineers
Montgomery and Runger

Assignment 4

a. Chapter 2: 117, 119, 121, 124.
b. Chapter 3: 1, 3, 5, 9, 13.

2-117. $$P(B|A) = \frac{P(A|B)P(B)}{P(A)} = \frac{P(A|B)P(B)}{P(A|B)P(B) + P(A|B')P(B')}$$
$$= \frac{0.4 \times 0.8}{0.4 \times 0.8 + 0.2 \times 0.2} = 0.89$$

2-119. (a) P=(0.31)(0.978)+(0.27)(0.981)+(0.21)(0.965)+(0.13)(0.992)+(0.08)(0.959)
= 0.97638

(b) $$P = \frac{(0.21)(0.965)}{0.97638} = 0.207552$$

2-121. Let G denote a product that received a good review. Let H, M, and P denote products that were high, moderate, and poor performers, respectively.

a)
$$P(G) = P(G|H)P(H) + P(G|M)P(M) + P(G|P)P(P)$$
$$= 0.95(0.40) + 0.60(0.35) + 0.10(0.25)$$
$$= 0.615$$

b) Using the result from part a.,
$$P(H|G) = \frac{P(G|H)P(H)}{P(G)} = \frac{0.95(0.40)}{0.615} = 0.618$$

c) $$P(H|G') = \frac{P(G'|H)P(H)}{P(G')} = \frac{0.05(0.40)}{1 - 0.615} = 0.052$$

Section 2-8

2-124. Continuous: a, c, d, f, h, i; Discrete: b, e, and g

3-1. The range of X is $\{0,1,2,\ldots,1000\}$

3-3. The range of X is $\{0,1,2,\ldots,99999\}$

3-5. The range of X is $\{1,2,\ldots,491\}$. Because 490 parts are conforming, a nonconforming part must be selected in 491 selections.

3-9. The range of X is $\{0,1,2,\ldots,15\}$

3-13. The range of X is {0,1,2,…, 40000)