ISE 2211 Statistics for Engineers

Homework #2 - Chapter 2 Probability (Montgomery & Runger, 6ed)

Problems:
  Answers to odd-numbered problems can be found in Appendix B.
  Answers to even-numbered problems are provided below.

  2-2 Axioms and Laws of Probability
  Page 34, Problems 2-65, 67, 70, 71

  2-3 Addition Rule
  Pages 38 - 39, Problems 2-82, 83, 85, 87

  2-4 Conditional Probabilities
  Pages 43 - 44, Problems 2-99, 105, 107, 109

  2-5 Multiplication Rule
  Page 48, Problems 2-121, 122, 125, 127, 129 Correction 2-129 b) 0.078

  2-6 Independence
  Pages 52 - 53, Problems 2-142, 144, 146, 147, 149

Answers:
  2-70   a) 0.86   b) 0.79   c) 0.14   d) 0.70   e) 0.95   f) 0.84

  2-82   a) 0.7   b) 0.4   c) 0.1   d) 0.2   e) 0.6   f) 0.8

  2-122   0.22

  2-142   No
            If A and B are independent, then $P(A|B) = P(A)$.
            Since $P(A|B) = 0.4$ and $P(A) = 0.5$, A and B are not independent.

  2-144   No
            If A and B are mutually exclusive, then $P(A \text{ AND } B) = 0$.
            If A and B are independent, then $P(A \text{ AND } B) = P(A) \times P(B)$.
            Since $P(A) \times P(B) = 0.2 \times 0.2 = 0.04 \neq 0$, A and B are not independent.

  2-146   No
            If A and B are independent, then $P(A \text{ AND } B) = P(A) \times P(B)$.
            $P(A \text{ AND } B) = 70/100 = 0.70$.
            Since $P(A) \times P(B) = 86/100 \times 79/100 = 0.68$, A and B are not independent.