53. For 3.18: This is \( \text{Pr}(B \cup C) = \text{Pr}(B) + \text{Pr}(C) - \text{Pr}(B \cap C) = .099 \)
   For 3.19: This is \( \text{Pr}(A \cup B \cup C) = .0143 \).
   For 3.20: This is \( \text{Pr}(A \cap \overline{B} \cap \overline{C}) + \text{Pr}(\overline{A} \cap B \cap \overline{C}) + \text{Pr}(\overline{A} \cap \overline{B} \cap C) = .1368 \)
   For 3.21: This is \( \text{Pr}(\text{affected person is female}) = .677 \).
   For 3.22: This is \( \text{Pr}(\text{both affected are female}) = .263 \).
   For 3.23: This is \( \text{Pr}(\text{both < 80}) = .160 \).

54. For 3.85: Use Baye’s theorem to find \( \text{Pr}(Y_1 | (X_1 \cap X_2 \cap X_4)) = .009 \).
   For 3.87: You are computing \( \text{Pr}(X_1 | Y_2) = .7 \).
   For 3.88: You are computing \( \text{Pr}(\overline{X}_1 | \overline{Y}_2) = .605 \).

55. For 3.104: .938.
   For 3.105: .988.

56. For 4.37: Use the binomial distribution to find that the answer is .172.

57. For 4.44: The probability of the 82 year old dying in the next year is \( p_1 = (l_{82} - l_{83})/l_{82} = .104 \).
   Similar probabilities, \( \{p_j\}_{24}^{11} \) can be obtained for the others. The sum, \( \sum_{i=1}^{11} p_j = .176 \), is the answer.

58. For 4.69: Use the binomial expansion with \( n = 5, p = .4 \) to find \( \text{Pr}(X = 3) = .230 \).
   For 4.70: \( \text{Pr}(X \geq 3) = .317 \) using binomial table (Table 1) in Chapter 4.

59. For 4.78: Use the Poisson distribution with \( \mu = 15.6 \) to find the answer \( \approx 7.651 \times 10^{-13} \).

60. For 5.31: This is given by \( \Phi(-1.667) = 1 - \Phi(1.667) \approx .048 \).
   For 5.32: This is given by \( \Phi(-3) = 1 - \Phi(3) \approx .0013 \).

61. For 5.61: This is \( 84!/(29! \times 55!) \times (.24)^{29} \times (.76)^{55} \approx .009 \)
   For 5.62: Use the fact that \( \text{Pr}(X \geq 29) = \text{Pr}(Y \geq 28.5) \) where \( Y \) is normally distributed with mean \( \mu = np = 20.16 \) and variance \( npq = 15.32 \). Thus, \( \text{Pr}(Y \geq 28.5) \approx .017 \).

62. For 5.64: \( \text{Pr}(X \geq 90) = 1 - \Phi(2.307) \approx .0105 \).
   For 5.65: Approximate the binomial distribution with a normal one of mean \( np = 21.1 \) and variance \( npq = 20.8 \). Then, \( \text{Pr}(X \geq 25) = 1 - \Phi(.0755) = .225 \).