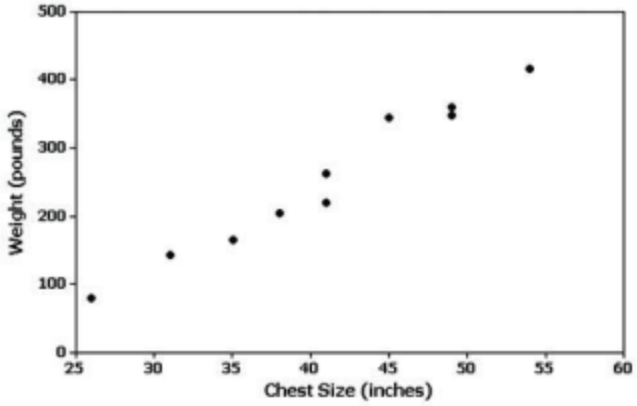
6. The straight-line pattern of the points suggests that there is a correlation between chest size and weight.



7. a. 1/575,757 b. 1/19 c. 1/10,939,383

Chapter 5: Answers

Section 5-2

1. The random variable is x, which is the number of girls in three births. The possible values of x are 0, 1, 2, and 3. The values of the random value x are numerical.
3. Table 5-7 does describe a probability distribution because the three requirements are satisfied. First, the variable x is a numerical random variable and its values are associated with probabilities. Second, $\Sigma P(x) = 0.125 + 0.375 + 0.375 + 0.125 = 1$ as required. Third, each of the probabilities is between 0 and 1 inclusive, as required.
5. a. Continuous random variable. b. Discrete random variable. c. Not a random variable. d. Discrete random variable. e. Continuous random variable. f. Discrete random variable.
7. Probability distribution with $\mu = 2.0$, $\sigma = 1.0$.
9. Not a probability distribution because the sum of the probabilities is 0.601, which is not 1 as required. Also, Ted clearly needs a new approach.
11. Probability distribution with $\mu = 2.2$, $\sigma = 1.0$. (The sum of the probabilities is 0.999, but that is due to rounding errors.)
13. Not a probability distribution because the responses are not values of a numerical random variable. Also, the sum of the probabilities is 1.18 instead of being 1 as required.
15. $\mu = 5.0$, $\sigma = 1.6$.
17. a. 0.044 b. 0.055
    c. The probability from part (b).
    d. No, because the probability of 8 or more girls is 0.055, which is not very low (less than or equal to 0.05).
19. $\mu = 0.9$ car, $\sigma = 0.9$ car
21. a. 0.041 b. 0.046 c. The probability from part (b).
    d. Yes, because the probability of three or more failures is 0.046, which is very low (less than or equal to 0.05).
23. a. 1000 b. 1/1000 c. \$499 d. −50¢
    e. The \$1 bet on the pass line in craps is better because its expected value of −1.4¢ is much greater than the expected value of −50¢ for the Texas Pick 3 lottery.
25. a. −39¢
    b. The bet on the number 27 is better because its expected value of −26¢ is greater than the expected value of −39¢ for the other bet.

Section 5-3

1. The given calculation assumes that the first two adults include Wal-Mart and the last three adults do not include Wal-Mart, but there are other arrangements consisting of two adults who include Wal-Mart and three who do not. The probabilities corresponding to those other arrangements should also be included in the result.
3. Because the 30 selections are made without replacement, they are dependent, not independent. Based on the 5% guideline for cumbersome calculations, the 30 selections can be treated as being independent. (The 30 selections constitute 3% of the population of 1000 responses, and 3% is not more than 5% of the population.) The probability can be found by using the binomial probability formula.
5. Not binomial. Each of the weights has more than two possible outcomes.
7. Binomial.
9. Not binomial. Because the senators are selected without replacement, the selections are not independent. (The 5% guideline for cumbersome calculations cannot be applied because the 40 selected senators constitute 40% of the population of 100 senators, and 40% exceeds 5%.)
11. Binomial. Although the events are not independent, they can be treated as being independent by applying the 5% guideline. The sample size of 380 is no more than 5% of the population of all smartphone users.
13. a. 0.128
    b. WWC, WCW, CWW; 0.128 for each
    c. 0.384
15. 0.051 17. 0.057 19. 0.328
21. 0.257 23. 0.00125 25. 0.996; yes
27. 0.037; yes, because the probability of 2 or fewer peas with green pods is small (less than or equal to 0.05).
29. a. 0.002 (Tech: 0.00154)
    b. 0+ (Tech: 0.000064)
    c. 0.002 (Tech: 0.00160).
    d. Yes, the small probability from part (c) suggests that 5 is an unusually high number.
31. a. 0.328 b. 0.410 c. 0.738 (Tech: 0.737)
    d. No, the probability from part (c) is not small, so 1 is not an unusually low number.
33. 0.101. No, because the probability of exactly 12 is 0.101, the probability of 12 or more is greater than 0.101, so the probability of getting 12 or more is not very small, so 12 is not unusually high.
35. 0.287. No, because the flights all originate from New York, they are not randomly selected flights, so the 80.5% on-time rate might not apply.
37. a. 0.000766 b. 0.999 c. 0.00829
    d. Yes, the very low probability of 0.00829 would suggest that the 45 share value is wrong.