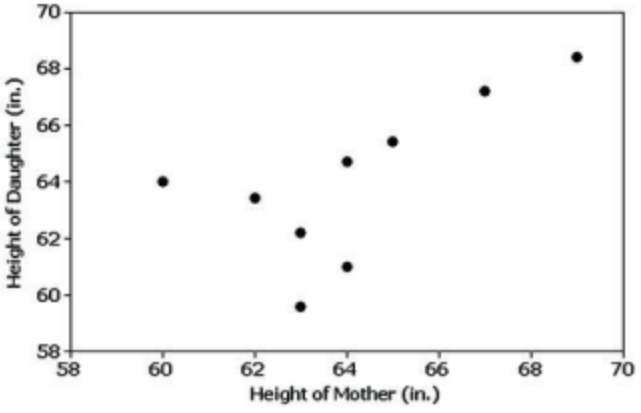
Chapter 9: Cumulative Review Exercises

1. a. Because the sample data are matched with each column consisting of heights from the same family, the data are dependent.
   b. Mean: 63.81 in.; median: 63.70 in.; mode: 62.2 in.; range: 8.80 in.; standard deviation: 2.73 in.; variance: 7.43 in^2
   c. Ratio
2. There does not appear to be a correlation or association between the heights of mothers and the heights of their daughters.

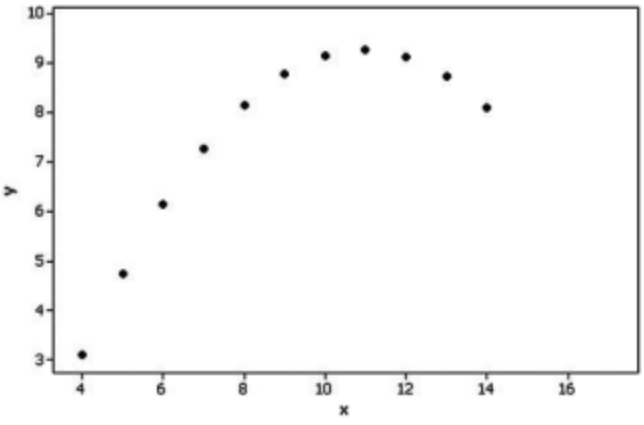


3. 61.86 in. $< \mu <$ 65.76 in. We have 95% confidence that the limits of 61.86 in. and 65.76 in. actually contain the true value of the mean height of all adult daughters.
4. H_0: $\mu_d = 0$. H_1: $\mu_d \neq 0$. Test statistic: $t = 0.283$. Critical values: $t = \pm 2.262$. P-value > 0.20 (Tech: 0.7834). Fail to reject H_0. There is not sufficient evidence to warrant rejection of the claim of no significant difference between the heights of mothers and the heights of their daughters.
5. Because the points lie reasonably close to a straight-line pattern and there is no other pattern that is not a straight-line pattern and there are no outliers, the sample data appear to be from a population with a normal distribution.
6. $0.109 < p < 0.150$. Because the entire range of values in the confidence interval lies below 0.20, the results do justify the statement that "fewer than 20% of Americans choose their computer and/or Internet access when identifying what they miss most when electrical power is lost."
7. No. Because the Internet users chose to respond, we have a voluntary response sample, so the results are not necessarily valid.
8. 2944. The survey should not be conducted using only local phone numbers. Such a convenience sample could easily lead to results that are dramatically different from results that would be obtained by randomly selecting respondents from the entire population, not just those having local phone numbers.
9. a. 0.9332 b. 0.9987
   c. 167.5 cm (Tech: 167.6 cm)
10. No. Because the states have different population sizes, the mean cannot be found by adding the 50 state means and dividing the total by 50. The mean income for the U.S. population can be found by using a weighted mean that incorporates the population size of each state.

Chapter 10

Section 10-2

1. r represents the value of the linear correlation computed by using the paired sample data. ρ represents the value of the linear correlation coefficient that would be computed by using all of the paired data in the population. The value of r is estimated to be 0 (because there is no correlation between sunspot numbers and the Dow Jones Industrial Average).
3. The headline is not justified because it states that increased salt consumption is the *cause* of higher blood pressure levels, but the presence of a correlation between two variables does not necessarily imply that one is the *cause* of the other. Correlation does not imply causality. A correct headline would be this: "Study Shows That Increased Salt Consumption Is Associated with Higher Blood Pressure."
5. Yes. With $r = 0.687$ and critical values of ± 0.312, there is sufficient evidence to support the claim that there is a linear correlation between the durations of eruptions and the time intervals to the next eruptions.
7. No. With $r = 0.149$ and a P-value of 0.681 (or critical values of ± 0.632), there is not sufficient evidence to support the claim that there is a linear correlation between the heights of fathers and the heights of their sons.
9. a.



   b. $r = 0.816$. Critical values: $r = \pm 0.602$. P-value $= 0.002$. There is sufficient evidence to support the claim of a linear correlation between the two variables.
   c. The scatterplot reveals a distinct pattern that is not a straight-line pattern.
11. a. There appears to be a linear correlation.
   b. $r = 0.906$. Critical values: $r = \pm 0.632$ (for a 0.05 significance level). There is a linear correlation.
   c. $r = 0$. Critical values: $r = \pm 0.666$ (for a 0.05 significance level). There does not appear to be a linear correlation.
   d. The effect from a single pair of values can be very substantial, and it can change the conclusion.
13. $r = -0.959$. Critical values: $r = \pm 0.878$. P-value $= 0.010$. There is sufficient evidence to support the claim that there is a linear correlation between weights of lemon imports from Mexico and U.S. car fatality rates. The results do not suggest any cause-effect relationship between the two variables.