MTH19: HW3

Pages 119–124:

2. Two average incomes: \$53,657 and \$75,738. One mean \$75,738, the other median. Support. Mean pulled up by zillionaires.
3. HUD uses the median to report the average price of a home in the United States. Why? To avoid zillionaires.
4. Distribution skewed right. Which will likely be larger, the mean or the median? Mean. Why? Mean pulled up by large values.
5. 10,000 values; where's the median? Mean of middle two values.
6. True or False: A data set will always have exactly one mode. F
7. Sample: 20, 13, 4, 8, 10 $\bar{x} = 11$
8. Sample: 83, 65, 91, 87, 84 $\bar{x} = 82$
9. Population: 3, 6, 10, 12, 14 $\mu = 9$
10. Population: 1, 19, 25, 15, 12, 16, 28, 13, 6 $\mu = 15$
11. 82,566 tickets; total value \$218,469,636. Mean? \$2,646
12. The median for the given set of six ordered data values is 26.5. What is the missing value? 7 12 21 32 41 50

    Work: $26.5 = \frac{21 + x}{2}$; so $2 \times 26.5 = 53 = 21 + x$; So $x = 32$.
13. Miles per Gallon. Compute the mean, median, and mode: 34.0, 33.2, 37.0, 29.4, 23.6, 25.9 30.52, 31.3, none.
14. Exam Time. Compute the mean, median, and mode time: 60.5, 128.0, 84.6, 122.3, 78.9, 94.7, 85.9, 89.9 93.1, 87.9, none.
19. Exam Scores
    a. Determine the mean and median score for each class. 71.82, 70.8; 77.48, 76.8
    b. Suppose the score of 59.8 in the traditional course was incorrectly recorded as 598. How does this affect the mean? 113.22 the median? 7.5 What property does this illustrate? Resistance
20. pH in Water.
    a. Determine the mean, median, and mode pH for each type of water. 7.50, 7.49, 7.47; 5.19, 5.22, 5.26
    b. Suppose the pH of 7.10 in tap water was incorrectly recorded as 1.70. How does this affect the mean? 7.05 the median? 7.49 What property of the median does this illustrate?Resistance
46. You are negotiating a contract for the Players Association of the NBA. Which measure of central tendency will you use to support your claim that the average player?s salary needs to be increased? Median Why? Resistant to high values. As the chief negotiator for the owners, which measure would you use to refute the claim made by the Players Association? Mean; pulled up by high salaries of superstar players.
47. In January 2016, the mean amount of money lost per visitor to a local riverboat casino was \$135. Do you think the median was more than, less than, or equal to this amount? Why? Mean affected by big losers.
48. For each of the following situations, determine which measure of central tendency is most appropriate and justify.
    a. Average price of a home sold in Pittsburgh, Pennsylvania, in 2011 Median
    b. Most popular major for students enrolled in a statistics course Mode
    c. Average test score when the scores are distributed symmetrically Mean (or Mode or Median)
    d. Average test score when the scores are skewed right Median
    e. Average income of a player in the National Football League Median
    f. Most requested song at a radio station Mode
    g. Typical number on the jersey of a player in the National Hockey League. Mode

Pages 134–138:

1. The sum of the deviations about the mean always equals 0
5. Sample: 20, 13, 4, 8, 10 36; 6
6. Sample: 83, 65, 91, 87, 84 100; 10
7. Population: 3, 6, 10, 12, 14 16, 4
8. Population: 1, 19, 25, 15, 12, 16, 28, 13, 6 64; 8
9. Sample: 6, 52, 13, 49, 35, 25, 31, 29, 31, 29 196; 14
10. Population: 4, 10, 12, 12, 13, 21 25; 5
17. Exam Scores:
    a. Which course has more dispersion using the range? Trad., 29.1 v 28.4
    b. Which course has more dispersion using the standard deviation? Trad., 8.84 v 7.85
    c. Suppose the score of 59.8 in the traditional course was incorrectly recorded as 598. How does this affect the range? 541.8 the standard deviation? 7.85 What property does this illustrate? Neither resistantt
18. pH in Water. Which type of water has more dispersion using the
    a. range? Tap; 0.59 v 0.26
    b. standard deviation? Tap; 0.154 v 0.081
21. Fishstory:
    a. Population mean and the range for each. 10, 19
    c. Population standard deviation for each. 4.9; 7.9 Do the values present a different story about the two fishermen's catches? Yes. Which fisherman has the more consistent record? Ethan
33. Which Professor? Students in Alpha's class have a mean score of 80% with a std. dev. of 5%, while past students in Omega's class have a mean score of 80% with a std. dev. of 10%. Which instructor, using a statistical argument? Better chance of doing OK with Alpha; better chance of excelling with Omega, but also chance of doing badly.
34. Summers: Lower s.d., if true, lower chance of excelling.
35. Avge. price of gas: \$3.06/gallon. Std. dev.: \$0.06/gallon.
    a. What minimum percentage of gasoline stations had prices within 3 standard deviations of the mean? 88.9%

    $$\left(1 - \frac{1}{k^2}\right) = \left(1 - \frac{1}{3^2}\right) = \left(1 - \frac{1}{9}\right) = 0.889$$

    Multiply by 100% to get answer.
    b. What minimum percentage of had prices within 2.5 standard deviations of the mean? 84% What are the prices that are within 2.5 standard deviations of the mean? \$2.91—\$3.21
    c. What is the minimum percentage of gasoline stations that had prices between \$2.94 and \$3.18? 75%
    Work: \$3.18 − \$3.06 = \$0.12. That's $k = 2$ s.d.
36. Commute time mean 27.3 minutes, std. dev. 8.1 minutes:
    a. What minimum percentage of commuters in Boston has a commute time within 2 standard deviations of the mean? 75%
    b. What minimum percentage of commuters in Boston has a commute time within 1.5 standard deviations of the mean? 55.6% What are the commute times within 1.5 standard deviations of the mean? 15.15—39.45
    c. What is the minimum percentage of commuters who have commute times between 3 minutes and 51.6 minutes? 88.9%
37. Comparing Standard Deviations The standard deviation of batting averages of all teams in the American League is 0.008. The standard deviation of all players in the American League is 0.02154. Why is there less variability in team batting averages? Variations in teams "wash out."