Algebra 2 Chapter 11 Review

HW #75: SHOW ALL WORK on a separate piece of paper

1. Mike was in charge of collecting contributions for the Food Bank. He received contributions of $20, $100, $30, $20, and $60.
   Find the following:
   mean
   median
   mode
   range

2. Last year the Wolverine football team scored the following number of points in its 10 games. Number of points: 17, 7, 28, 21, 24, 35, 14, 10, 31, 20. Find the mean, the range, and the standard deviation of the data.

3. Explain what happens to the mean, the median, the range, and the standard deviation when the same constant value is added to each value in a data set.

4. Explain what happens when each value in a data set is multiplied by the same positive constant.

5. The table below shows the price of an individual pizza at five different airports.

Chicago (O'Hare)	$4.02
San Francisco	$4.96
New York (JFK)	$6.30
Los Angeles	$5.82
Denver	$4.67

   a. Find the mean and median of the pizza prices.
   b. Find the range and standard deviation of the pizza prices.
   c. 10% sales tax is added to the price of each pizza. Use what you know about multiplying each value in a data set by a constant to find the mean, median, range, and standard deviation of the total costs of the pizzas.

6. Last year, the personal best high jumps of track athletes in a nearby state were normally distributed with a mean of 208 cm and a standard deviation of 15 cm. What is the probability that a randomly selected high jumper has a personal best of:
   a) between 223 and 238 cm
   b) at least 223 cm
   c) between 193 cm and 253 cm

7. Suppose the test scores on an exam show a normal distribution with a mean of 82 and a standard deviation of 5.
   a. Within what range do about 95% of the scores fall?
   b. About what percent of the scores are between 77 and 92?

8. When 900 voters were polled, 53% said they were voting *yes* on an initiative measure. Find the margin of error and the interval that is likely to contain the true population percent.

9. According to a recent survey, 45% of American teenagers in a random sample said they prefer thick crust pizza to thin crust. If the margin of error is $\pm 6\%$, about how many students were surveyed?

10. The mean age of the employees at a company is 40. The standard deviation of the ages is 3. Suppose the same people were working for the company 5 years ago. What were the mean and the standard deviation of their ages then?

11. Suppose the test scores on an exam show a normal distribution with a mean of 82 and a standard deviation of 5.
    a. Within what range do about 95% of the scores fall?
    b. About what percent of the scores are between 77 and 92?

12. Describe a normal distribution. Explain the 68-95-99.7 rule.

Problems 13 - 15, determine which sampling method is used.

13. every seventh student on the class list

14. mail a response card

15. the first 40 students who enter the office

16. Identify the type of sample and describe the population of the survey. Then tell if the sample is potentially biased. Explain your reasoning.
The first 50 students to arrive at school are surveyed.

17. Each year the junior class goes on a field trip. You want to poll the class to find out where they would like to go. There are 141 students in the junior class. Describe a method for selecting a random sample of 20 juniors.

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Answer Section

1. mean = $46
   median = $30
   mode = $20
   range = $80
2. 20.7; 28; ≈ 8.58
3. Sample answer: When a constant value is added to every value in a data set, the mean and the median are translated by the constant value, while the range and the standard deviation remain the same.
4. The mean, median, range, and standard deviation are multiplied by the constant.
5. a. $5.15; $4.96
   b. $2.28; ≈ $0.81
   c. $5.67; $5.46; $2.51; $0.89
6. a) 13.5%
   b) 16%
   c) 83.85%
7. a. $72 \le x \le 92$
   b. about 81.5%
8. ±3.3%; between 49.7% and 56.3%
9. about 278 students
10. mean = 35, standard deviation = 3
11. a. $72 \le x \le 92$
    b. about 81.5%
12. Sample answer: A normal distribution is modeled by a bell-shaped curve called a normal curve. The mean and median of the data are equal and both are on the line of symmetry of the curve. The 68-95-99.7 rule for a normal distribution indicates that 68% of the data are within one standard deviation of the mean, 95% of the data are within two standard deviations, and 99.7% of the data are within three standard deviations.
13. systematic
14. self - selected
15. convenience
16. Sample answer: Convenience; the population is all students who attend the school; the sample is not biased, because the surveyor has no control over who arrives at school first.
17. Answers may vary. Sample answer: Make a list of all 141 juniors. Assign each junior a different integer from 1 to 141. Generate 20 unique random integers. Poll the 20 students that correspond to the 20 integers you generated.