

Algebra II/Trig Unit 9 Review Sheet**1. Identify the sampling technique used in each scenario.**

- a. A researcher for an airline interviews all of the passengers on five randomly selected flights.
- b. Based on 12,500 responses from 42,000 surveys sent to its alumni, a major university estimated that the annual salary of its alumni was \$92,500.
- c. A market researcher randomly selects 200 drivers under 35 years of age and 100 drivers over 35 years of age.
- d. All of the teachers from 85 randomly selected nation's middle schools were interviewed.
- e. To avoid working late, the quality control manager inspects the last 10 items produced that day.
- f. The names of 70 contestants are written on 70 cards, The cards are placed in a bag, and three names are picked from the bag.

2. A study found that the average stopping distance of a school bus traveling 50 mph was 264 feet. A group of automotive engineers decided to conduct a study of Newhall School District school buses and found that for 20 randomly selected buses, the average stopping distance of buses traveling 50 mph was 262.3 feet.

- a. This study was conducted by examining every 3rd bus in the bus parking lot. What type of sampling method was used?
- b. Was this study an experiment, or an observational study? Explain.
- c. Can the results of this study be generalized to all NSD buses. Why or why not?

3. A local group is worried about helping teens make healthy life choices. They gather a group of overweight teen volunteers in Santa Clarita and assign one of two treatments. Half of the teens are randomly assigned to continue eating as before. The other half are assigned to drink at least 10 glasses of water per day, exercise for at least 30 minutes 5 times per week, and follow a specific food plan. The teens are weight at the start of the study, and again 2 months later.

- a. What was the population in this study? What was the sample?
- b. Was this an observational study or an experiment? Why?
- c. If the treatment group has significantly higher weight loss than the group who ate as before, can we conclude that the new eating and exercise routine caused the change? Why or why not?
- d. Why were half of the teens told to continue as before? Why weren't they all given the new diet and exercise regiment?
- e. Can the results of this study be generalized to all overweight Santa Clarita teens? Why or why not?

4. **Based solely on the mean and median given, decide on the most likely shape of each distribution. Justify**
- | | | |
|---------------|--------------|---------------|
| a. Mean = 100 | b. Mean = 20 | c. Mean = 934 |
| Median = 99 | Median = 41 | Median = 850 |
5. **A distribution of freshman English benchmark test scores is approximately normal with a mean of 78 and a standard deviation of 9.**
- Use the above information to sketch and label and curve using the **Empirical Rule**.
 - Find the range for the middle 99.7% of the data.
 - What percent of the data is below 69?
 - Your friend's z-score for the test is 2.33. Interpret her z-score in context, then calculate her actual test score.
 - What value has 0.15% of the data above it?
 - What percent of the data is between 60 and 105?
6. **The number of Skittles in a fun size bag follows an approximately normal distribution with a mean amount of 14 candies and a standard deviation of 2.7. I**
- What proportion of the bags would I expect to have less than 10 skittles?
 - What proportion of the bags would I expect to have between 12 and 15 skittles?
 - I purchased 400 fun size bags of Skittles for Halloween. HOW MANY BAGS would I expect to have at least 17 skittles?
 - The number of Skittles in a given bag is at the 80th percentile. Approximately how many skittles are in the bag?
 - You buy a bag of Skittles with an amount of candies in the top 10%. What the minimum amount of candies your bag has.
 - You earn a 95 on the English benchmark and open a bag with only 8 Skittles in it. Which is more unusual? Justify.

7. **An Algebra II/Trig student who works for a veterinary clinic part-time is given permission to examine the files of 11 adult cat patients and record their weights (rounded to the nearest whole number) in pounds. She recorded:**

| | | | | | | | | | | |
|---|---|---|----|----|----|----|----|----|----|----|
| 8 | 9 | 9 | 10 | 10 | 15 | 13 | 12 | 11 | 13 | 11 |
|---|---|---|----|----|----|----|----|----|----|----|

- a. Calculate the mean
b. Calculate the median
c. Calculate the range
- d. Calculate the standard deviation without Desmos. Show all work.

8. **Jersey Mike's advertises their Giant subs as 14" long. Naturally, they vary slightly in length. Suppose lengths vary according to a normal distribution with mean = 14.24" and standard deviation = .13". Use a Table of Standard Normal Probabilities to answer the following questions.**

- a. What proportion of sandwiches is shorter than advertised?
- b. What proportion is longer than 14.30"?
- c. What proportion is between 14" and 14.5"?
- d. If a sub's length is at the 25th percentile, how long is it?
- e. Ms. McCormick buys a sub, measures it and, using her nerdy superpowers, calculates that only 3% of the subs sold are longer than the one she just purchased. How long is the sub?

Answers

1. a) Cluster b) Convenience c) Stratified d) Cluster e) Convenience f) SRS
2. a) Systematic b) Observational Study. They observed what the buses did. They didn't impose treatment.
c) Yes. The sample was chosen at random.
3. a) All overweight teens in Santa Clarita; A group of overweight teens who volunteer for the study.
b) This was an experiment because the subjects were assigned to either change their routine or keep it the same.
c) Yes we can. The treatments were assigned at random.
d) The researchers needed a basis for comparison, to see what would happen to overweight teens who changed nothing.
e) No they cannot because this was not a random sample. The subjects were volunteers.
4. a) Symmetric because the mean and median are approximately the same.
b) Skewed left because mean < median.
c) Skewed right because mean > median.
5. b) 51 to 105
c) 16 %
d) Her test score is 2.33 standard deviations above the mean. Her actual test score is about 99.
e) 105
f) 97.35%
6. a) 0.0694 b) 0.4147 c) About 53.4 d) About 16.3 e) 17.5 Skittles
f) The Skittles bag is more unusual because it's z-score is further from 0 than the z-score for the English test.
7. a) 11 b) 11 c) 7 d) 2.10
8. a) 0.0322 b) 0.3228 c) 0.945 d) 14.15" e) 14.48"