

Statistics

Unit 8 Review

Name _____

1. Identify the population, the parameter, the sample and the statistic.

How much do gasoline prices vary in a large city? To find out, a reporter records the price per gallon of regular unleaded gasoline at a random sample of 10 gas stations in the city on the same day. The average of the prices in the sample is \$3.45.

2. In the game of Scrabble, each player begins by drawing 7 tiles from a bag containing 100 tiles. There are 42 vowels (42%), 56 consonants (56%) and 2 blank tiles (2%) in the bag. Katie chooses an SRS of 7 tiles. Let \hat{p} be the proportion of vowels in her sample.

a. Can Katie use the formula for standard deviation, why or why not?

b. Can Katie use the normal approximation? why or why not?

3. The Gallup Poll asked a random sample of 1785 adults whether they attended church during the past week. Let \hat{p} be the proportion of people in the sample who attended church. A newspaper report claims that 40% of all U.S. adults went to church last week. Suppose this claim is true.

a. What is the mean of the sampling distribution of \hat{p} ?

b. Find the standard deviation of the sampling distribution of \hat{p} . Can we use it? Why or why not?

c. Is the sampling distribution of \hat{p} approximately Normal? Why or why not?

d. Find the probability of obtaining a sample of 1785 adults in which 44% or more say they attended church last week.

4. Can you use the normal approximation for the following? Why or why not?
- David's iPod has about 10,000 songs. The distribution of the play times for these songs is heavily skewed to the right with a mean of 224 seconds and a standard deviation of 60 seconds. Suppose we take an SRS of 10 songs.
 - A car company has found that the lifetime of its batteries varies from car to car according to a Normal distribution with a mean of 48 months and standard deviation of 8.2 months. Suppose we take an SRS of 8 cars.
 - The time that people have to wait for an elevator in an office building has a uniform distribution (not Normal) over the interval from 0 to 1 minute. For this distribution the mean is 0.5 minutes and the standard deviation is .289 minutes. Suppose we take an SRS of 50 wait times.
5. A manufacturing process is designed to produce bolts with a mean diameter of 0.5 inches and standard deviation of 0.02 inches. Once each day, a random sample of 36 bolts is selected and the bolt diameters are recorded. If the resulting sample mean is less than 0.49 inches or greater than 0.51 inches, the process is shut down for adjustment.
- What is the mean of the sampling distribution?
 - What is the standard deviation of the sampling distribution? Can we use it? Why or why not?
 - Can we use the normal approximation? Why or why not?
 - What is the probability that the manufacturing line will be shut down unnecessarily? (Hint: Find the probability of getting an average bolt diameter in the shut down range, when the actual process mean is 0.5)