Write

Write a definition for each term in your own words.

1. population proportion
2. sample proportion
3. sampling distribution
4. confidence interval

Remember

To analyze data from a sample survey, observational study, or experiment, use confidence intervals to determine a range of values for the population mean(s) or proportion(s).

Practice

1. Roosevelt High School is considering a requirement for all 1300 student to wear uniforms to school. Of the 300 parents surveyed by the school, 141 said they were in favor of mandatory school uniforms.
   a. Determine the sample proportion that represents the percent of parents in favor of mandatory school uniforms.
   b. Determine a 95% confidence interval for the population proportion using the sample proportion you determined in part (a). Round your answer to the nearest tenth of a percent.
   c. A group of high school students conducted their own survey of 500 parents. The normal curve displays the sample proportion that represents the percent of parents in favor of mandatory school uniforms and the standard deviation of the sampling distribution. Determine a 95% confidence interval for the population proportion based on the students' sample proportion. Round your answer to the nearest tenth of a percent.

0.444   0.466   0.488   0.510   0.532   0.554   0.576
Proportion of Parents in Favor in School Uniforms
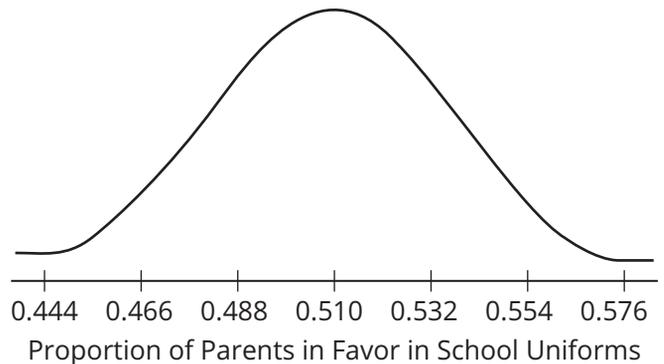
   d. Based on the given information in part (c), how many of the parents who responded to the students' survey are in favor of mandatory school uniforms?
   e. Which survey would you expect to be more accurate, the school's survey or the students' survey? Explain your reasoning.

2. Two hundred teenage boys were surveyed about the number of hours they spend each week playing video games. The sample mean was 11.7 hours and the standard deviation was 3.4 hours.
   a. Determine the standard deviation for the population mean.
   b. Determine a 95% confidence interval for the population mean.

3. Five hundred teenage girls were surveyed about the number of hours they spend each week listening to music. The sample mean was 9.2 hours and the standard deviation was 2.7 hours.
   a. Determine the standard deviation for the population mean.
   b. Determine a 95% confidence interval for the population mean.

Stretch

1. The lower and upper bounds for confidence intervals of 68%, 95%, and 99.7% for population proportions are calculated by adding to and subtracting from the sample proportion either 1, 2, or 3 standard deviations. Consider a confidence interval of 90%.

   a. Determine how much area would be in each tail of a standard normal distribution if 90% of the data was in the center.

   b. Determine the lower and upper z-scores of the area under the standard normal curve that would contain 90% of the data.

   c. Revisit the Roosevelt High School mandatory uniform scenario from the Practice section. Use the z-score you determined in part (b) to determine a 90% confidence interval for the population proportion of parents in favor of mandatory school uniforms. Round your answer to the nearest tenth of a percent.

   d. Compare the 90% and 95% confidence intervals. Explain the difference.

Review

1. Twenty students at a small college took the GRE exam. Each student was given an identification number from 01 through 20. Students 01 through 10 are business majors and students 11 through 20 are psychology majors. The table shows the students scores on the verbal reasoning portion of the exam. Scores on the exam range from 130 to 170 in 1 point increments.

Student ID Number	Score	Student ID Number	Score
01	145	11	158
02	130	12	143
03	148	13	140
04	166	14	164
05	133	15	136
06	153	16	147
07	146	17	159
08	139	18	160
09	165	19	170
10	155	20	138

   a. Create a simple random sample of 6 scores from the table. Explain how you created your sample.

   b. Calculate the average of your sample.

   c. The actual average score is approximately 149.75. How does the average of your sample compare?

2. A researcher recorded the cholesterol levels of a sample of women aged 60-70. The average cholesterol level was 201 milligrams per deciliter and the standard deviation was 40 milligrams per deciliter. The resting heart rates follow a normal distribution.

   a. Label the number line so that the curve is a normal curve and follows the properties of a normal distribution. Include 3 standard deviations above and below the mean.

Cholesterol Levels (mg/dL)

   b. Determine the percent of women who have cholesterol levels between 2 standard deviations below the mean and 1 standard deviation below the mean.

   c. Approximately what percent of women had cholesterol levels above 321 milligrams per deciliter?

3. Convert 210° to radians.

4. Convert $\frac{5\pi}{12}$ to degrees.