

## **One Large-Sample (... but not too large) Confidence Interval for a Population Proportion - Practice Problems**

**Q1)** At a large high school a random, representative sample of 45 students was obtained using simple random sampling (SRS). Of them, 25 have had already taken at least one AP course. Based on this sample, create and interpret a 90% confidence interval for the true proportion of the students of this high school who have already taken at least one AP course.

**Q2)** The state of Florida would like to estimate the proportion of Hispanic residents who would favor new legislation to provide a path for immigrants who came illegally to the U.S. to obtain a permanent resident status. In a survey of 1,250 Hispanics who live in Florida, 930 said they are in favor of such new legislation. Assume that this sample was taken in a way that is representative of all Hispanics in Florida. Create and interpret a 95% confidence interval for the proportion of Hispanics in Florida who are not in favor of new legislation to allow immigrants who came illegally to the country a path to permanent residency.

**Q3)** In a recent survey conducted by the U.S. Food and Drug Administration (FDA), from a sample of 640 high school students who regularly use tobacco products, 155 of them reported they are suffering from severe symptoms of psychological distress. Create and interpret a 99% confidence interval of the proportion of high school tobacco users who suffer from severe symptoms of psychological distress.

**Q4)** In a recent national survey, 2150 out of 3200 adult Americans stated that they are sports fans. Based on this sample create and interpret a 96% confidence interval for the proportion of adult Americans who consider themselves sports fans.

**Q5)** A candidate for the upcoming mayoral elections for the city of Miami would like to estimate the proportion of the local residents who would be in favor of a new taxation to support more public parks and green spaces within 5%. Calculate the required sample size to achieve such an estimate with 95% confidence level.

**Q6)** If we were to obtain a 90% confidence interval of the proportion of current college students who are the first in their family to obtain a Bachelor's degree or higher ("*first generation*") with a margin of error of 3%, what is the minimum number of college students we need to survey?

## **Large-Sample z- Confidence Interval for a Population Mean & Large-Sample t- Confidence Interval for a Population Mean**

**Q1)** A random sample of 720 high school students was selected in a way that is considered representative of all juniors. Their mean SAT score from the “school-day” March 2023 administration was 965 points. It is known that typically the standard deviation of the SAT score nation-wide is 150. Create and interpret a 95% confidence interval for the average SAT score of all U.S. high school juniors from the March 2023 “school-day” administration.

**Q2)** The state of Florida would like to estimate the average size of Hispanic families. A representative sample of 50 families was found to have a mean size of 4.1 with a standard deviation of 0.5. Create and interpret a 95% confidence interval for mean size of the Hispanic families in Florida.

**Q3)** In a recent survey conducted on 24 U.S. Food and Drug Administration (FDA) employees, it was found that their average annual salary was \$53,450 with a standard deviation of \$4,115. It is generally believed that the distribution of the salaries of the department's employees is approximately normal. Create and interpret a 99% confidence interval for the average annual salary of the FDA employees.

**Q4)** A sample of the duration of 10 flights between Orlando (FL) and Bogota (Colombia) is shown below (flight duration in minutes):

270, 256, 267, 285, 274, 275, 266, 258, 271, 281

Use this data to create a 90% confidence interval for the mean duration of the flight between Orlando and Bogota.