6.2.1: Exercises

1. In a Washington Post-University of Maryland poll[5] of 1503 randomly selected US adults, 55% said they strongly support gender equity in sports. In the following exercises, you will construct a 99% confidence interval for the proportion of US adults who strongly support gender equity in sports.

   a. Identify the relevant information:

      i. What is the sample size?

      ii. What is the sample proportion?

      iii. Write a sentence to describe what the population parameter is in context.

   b. Step 1: Is the sampling distribution of sample proportions approximately normal? Why or why not?

   c. Step 2: Compute the critical value from the standard normal distribution that corresponds to a confidence level of 99%. Write the function you use in desmos to find a critical value from the standard normal distribution.

   d. Step 3: Compute the margin of error $E \approx Z_c \cdot \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$. Round to three decimal places.

   e. Step 4: Give the lower and upper limits of the 99% confidence interval for the population proportion (p). Then write the interval in interval notation.

   f. Step 5: Interpret the interval in context. Is it likely that a majority of US adults strongly support gender equity in sports? Use the interval to support your answer.

2. In a CNN poll[6] of 1002 randomly selected US adults, 371 approve of the supreme court's decision to overturn Roe v. Wade. Construct a 95% confidence interval for the true proportion of US adults who approve of the supreme court's decision to overturn Roe v. Wade.

   a. Write a sentence describing p in context.

   b. Step 1: Verify that the sampling distribution of sample proportions is approximately normal. Justify your answer.

   c. Step 2: Compute the critical value.

   d. Step 3: Compute the sample proportion and the margin of error rounded to three decimal places.

   e. Step 4: Compute the interval in interval notation.

   f. Step 5: Interpret the interval in context.

   g. Is it possible that a majority approves of the supreme court's decision to overturn Roe v Wade? Use the interval to support your answer.

3. According to a poll[7] conducted by Gallup of 800 randomly surveyed US adults, 312 respondents were satisfied with the quality of the environment. Construct a 90% confidence interval using the five step process. Round the margin of error to three decimal places.

Reference

[5] Liz Clarke, Scott Clement, and Emily Guskin, "Most Americans support gender equity in sports scholarships, poll finds," *Washingtonpost.com*, June 22, 2022, accessed September 27, 2022, https://www.washingtonpost.com/sports/2022/06/22/title-ix-poll-americans-support-gender-equity/

[6] Jennifer Agiesta, "About two-thirds of Americans disapprove of overturning Roe v. Wade, see negative effect for the nation ahead," *CNN.com*, July 28, 2022, accessed September 27, 2022, https://www.cnn.com/2022/07/28/politics/cnn-poll-abortion-roe-v-wade/index.html

[7] Jeffrey M. Jones, "Americans Offer Gloomy State of the Nation Report," *Gallup.com*, February 2, 2022, accessed September 27, 2022, https://news.gallup.com/poll/389309/americans-offer-gloomy-state-nation-report.aspx