

# Honors Advanced Algebra

## Proportion Intervals

Name: \_\_\_\_\_

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1. The Harris Poll asked a random sample of 1009 adults which causes of death they thought would become more common in the future. Topping the list was gun violence: 70% of the sample thought deaths from guns would increase.
  - a. How many of the 1009 people interviewed thought deaths from gun violence would increase? Explain.
  - b. Harris says that the margin of error for this poll is plus or minus 3 percentage points. Explain to someone who knows no statistics what "margin of error plus or minus 3 percentage points" means.
  - c. Construct and interpret a 95% confidence interval for this survey. Does your margin of error agree with the 3 percentage points announced by Harris?
  - d. Describe two practical issues involved in conducting a survey that are not included in the margin of error.
  
2. A random sample of 1100 teenagers (ages 12 to 17) were asked whether they played games online; 775 said that they did.
  - a. Construct and interpret a 99% confidence interval for the population proportion  $p$ .
  
  - b. How large a sample would you need to take to estimate  $p$  within 2% at a 99% confidence level? Show your work.
  
  - c. Explain how the estimate obtained from this survey could have been affected by response bias.

3. A news article on a Gallup Poll noted that “28 percent of the 1548 adults questioned felt that those who were able to work should be taken off welfare.” The article also said, “The margin of error for a sample size of 1548 is plus or minus three percentage points.”
- What is the 99% confidence interval from this poll? Interpret the interval in context.
  - What conditions must be met in order for the confidence interval in Question 3 to be valid? Check whether each of those conditions is satisfied in this case.
  - This poll was conducted by telephone. Explain how this could lead to a biased estimate in this case.
4. A *New York Times* poll on women’s issues interviewed 1025 women randomly selected from the United States, excluding Alaska and Hawaii. The poll found that 47% of the women said they do not get enough time for themselves.
- What is the 95% confidence interval from this poll result? Interpret the interval in context.
  - What conditions must be met in order for the confidence interval in Question a to be valid? Check whether each of those conditions is satisfied in this case.
  - Explain to someone who knows no statistics why we can’t just say that 47% of all adult women do not get enough time for themselves.
  - Explain clearly what “95% confidence” means in context to the problem.