

## ONE SAMPLE CONFIDENCE INTERVALS – EXTRA PRACTICE

*AP Statistics · Unit 6 · Mr. Merrick · February 2, 2026*

1. A school administrator is concerned about students who report being absent due to illness but are later seen attending school-sponsored events on the same day.

A random sample of 120 illness-related absences was selected, and 31 of those students attended a school event that day.

- (a) Construct and interpret a 95% confidence interval for the proportion of all illness-related absences that are not legitimate.

- (b) The administrator estimates that each illegitimate absence costs the school \$42 in lost funding. If the school records 4,800 illness-related absences per year, estimate the annual cost using the confidence interval from part (a).

2. A national polling agency surveyed a random sample of 1,250 adults and asked which of the following best reflects their opinion.

| Response          | Online Shopping | In-store Shopping | No Preference |
|-------------------|-----------------|-------------------|---------------|
| Percent of sample | 46%             | 41%               | 13%           |

(a) Construct and interpret a 99% confidence interval for the proportion of all U.S. adults who prefer shopping in stores.

(b) One condition for inference is that both  $n\hat{p}$  and  $n(1 - \hat{p})$  are at least 10. Explain why this condition is necessary.

(c) A student suggests using a two-sample  $z$ -interval to compare the proportions who prefer online shopping and in-store shopping. Is this appropriate? Justify your answer.

3. A city council wants to estimate the proportion of residents who support a proposed zoning change.

(a) What minimum sample size is required to estimate the true proportion with a margin of error no greater than 0.03 at the 95% confidence level? Assume no prior estimate of the proportion is available.

(b) Explain why using  $p = 0.5$  produces the most conservative sample size estimate.