

1.
 - a. Because there is only one sample of data used to evaluate the claim.
 - b. Because when conditions are met, the sampling distribution of the sample proportion is approximately normal, and the standardized test statistic used to find the p -value is a z -score.
 - c. Because we are doing a hypothesis test, not a confidence interval.
 - d. Because the claim being evaluated is about the population proportion, p .

2.
 - a. $p > 0.50$ means that more than 50% of registered voters in the city are in favor of the proposal (the proposal will pass).
 - b. Yes, because $\hat{p} = 0.62$, which is greater than 0.50.
 - c. No, because $0.19 > 0.05$, the news organization would fail to reject H_0 . There is not convincing evidence that the proposal will pass.
 - d. This happens when the sample proportion is different than the null hypothesis value (in the same direction as the alternative hypothesis), but it is plausible to get this sample proportion purely by chance if the null hypothesis is true.

3. a. CLASSIFY:

Type of study: Observational study

Variable: Whether Canadian adults have built a snowman. (Categorical)

CHOOSE:

one-sample z -test for p at $\alpha = 0.05$

p = true proportion of all Canadian adults who have never built a snowman

$H_0 : p = 0.33, H_a : p \neq 0.33$

CHECK:

Random: random sample of 200 Canadian adults

10%: $200 \leq 0.10$ (all Canadian adults)

Large Counts: $200(0.33) = 66 \geq 10$; $200(1 - 0.33) = 134 \geq 10$

CALCULATE:

$$z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{0.25 - 0.33}{\sqrt{\frac{0.33(0.67)}{200}}} = -2.41$$

p -value = 0.016

CONCLUDE:

Assuming H_0 is true ($p = 0.33$), there is a 0.016 probability of getting a $\hat{p}$ of 0.25 or more extreme in either direction purely by chance. Because $0.016 < 0.05$, we reject H_0 and do have convincing statistical evidence that the proportion of all Canadian adults that have never built a snowman is different than the proportion for Americans.

- b. Any value between 0.19 and 0.31 is plausible for the true proportion of all Canadian adults who have never built a snowman. Because the null hypothesis value of $p = 0.33$ is not contained within the interval, André would reject H_0 just as he did in part (a).

4. a. Result 2 is more convincing because 9 is farther away than 3 from what would be expected for a fair coin (5).

- b. Result 2 is more convincing because it is far less likely to get 90 out of 100 heads from a fair coin than 9 out of 10 heads from a fair coin.

5. C

6. D