

1- PROPORTION Z-INTERVAL

This test is used to construct a confidence interval for a population proportion (p) using a sample proportion (\hat{p})

The Gallup Youth Survey asked a random sample of 439 U.S. teens aged 13 to 17 whether they thought young people should wait to have sex until marriage. Of the sample, 246 said “Yes”.

Construct and interpret a 95% confidence interval for the proportion of all teens who would say “Yes” to this question.

P) IDENTIFY POPULATION PARAMETER:

p = proportion of all U.S. teens who think young people should wait to have sex until they get married

A) VERIFY CONDITIONS REQUIRED FOR TEST:

a) Random:

Random sample used

b) Normal:

$$n\hat{p} \geq 10 ?$$

$$(439)(246 / 439) \geq 10 ?$$

$$246 \geq 10 \checkmark$$

$$n(1 - \hat{p}) \geq 10 ?$$

$$(439)(193 / 439) \geq 10 ?$$

$$193 \geq 10 \checkmark$$

c) Independent:

$$N > 10(439) > 4,390 \text{ US teens } \checkmark$$

T) CONSTRUCT INTERVAL

a) USE t DISTRIBUTION TABLE:

$$95\% CI = \hat{p} \pm z^* \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

$$95\% CI = .56 \pm 1.96 \sqrt{\frac{(.56)(.44)}{439}}$$

$$95\% CI = .56 \pm .046$$

$$95\% CI = (.514, .606)$$

b) USE CALCULATOR:

STAT \rightarrow TESTS \rightarrow 1-Prop Z Int \rightarrow (.514, .606)

\downarrow
X = # of Successes

S) STATE CONCLUSION:

We are 95% confident that the interval from .514 to .606 captures the actual proportion of all U.S. teens (13-17) who would say that teens should wait until marriage to have sex.