

Stat Support Activity: One-Population Test Statistics

Notes on the one population proportion Z-test statistic

- Categorical Data %
- Compare to the critical value in the standard normal Z distribution.
- Compares Random Sample Proportion (\hat{p}) to the Population Proportion (π or p) in the Null Hypothesis (H_0)
- Sentence: The sample proportion is _____ number of standard errors (above or below) the Population Proportion in the null hypothesis. ("Above" if positive. "Below" if negative.)
- Formula

$$Z = \frac{(\text{Sample Proportion} - \text{Population Proportion})}{\text{Standard Error}} = \frac{(\hat{p} - p)}{\sqrt{\frac{p(1-p)}{n}}}$$

Notes on the one population mean average T-test statistic

- Quantitative Data Mean Average
- Degrees of Freedom $df = n - 1$
- Compare to the critical value in the student T distribution with $n - 1$ degrees of freedom.
- Compares Random Sample Mean (\bar{x}) to the Population Mean (μ) in the Null Hypothesis (H_0)
- Sentence: The sample mean is _____ number of standard errors (above or below) the population mean in the null hypothesis. ("Above" if positive. "Below" if negative.)
- Formula

$$T = \frac{(\text{Sample Mean} - \text{Population Mean})}{\text{Standard Error}} = \frac{(\bar{x} - \mu)}{\left(\frac{s}{\sqrt{n}}\right)}$$

Problems

(#1-3) Directions: Calculate the one-population proportion Z test statistic and write a sentence explaining the meaning of the Z test statistic.

1.

Sample Proportion (\hat{p}) = 0.872

Population Proportion (p) in $H_0 = 0.8$

Sample Size (n) = 47

$$Z = \frac{(\hat{p} - p)}{\sqrt{\frac{p(1-p)}{n}}} =$$

Z-test statistic sentence: The sample proportion is _____ number of standard errors (above or below) the population proportion in the null hypothesis.

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2.

Sample Proportion (\hat{p}) = 0.333

Population Proportion (p) in $H_0 = 0.4$

Sample Size (n) = 39

$$Z = \frac{(\hat{p} - p)}{\sqrt{\frac{p(1-p)}{n}}} =$$

Z-test statistic sentence: The sample proportion is _____ number of standard errors (above or below) the population proportion in the null hypothesis.

3.

Sample Proportion (\hat{p}) = 0.118

Population Proportion (p) in $H_0 = 0.25$

Sample Size (n) = 85

$$Z = \frac{(\hat{p} - p)}{\sqrt{\frac{p(1-p)}{n}}} =$$

Z-test statistic sentence: The sample proportion is _____ number of standard errors (above or below) the population proportion in the null hypothesis.

(#4-6) Directions: Calculate the one-population mean average T test statistic and write a sentence explaining the meaning of the T test statistic.

4.

Sample Mean (\bar{x}) = \$56.72

Population Mean (μ) in $H_0 = \$50$

Sample Standard Deviation (s) = \$9.31

Sample Size (n) = 26

$$T = \frac{(\bar{x} - \mu)}{\left(\frac{s}{\sqrt{n}}\right)} =$$

T-test statistic sentence: The sample mean is _____ number of standard errors (above or below) the population mean in the null hypothesis.

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5.

Sample Mean (\bar{x}) = 98.26° F

Population Mean (μ) in H_0 = 98.6° F

Sample Standard Deviation (s) = 0.765° F

Sample Size (n) = 50

$$T = \frac{(\bar{x} - \mu)}{\left(\frac{s}{\sqrt{n}}\right)} =$$

T-test statistic sentence: The sample mean is _____ number of standard errors (above or below) the population mean in the null hypothesis.

6.

Sample Mean (\bar{x}) = 12.3 cm

Population Mean (μ) in H_0 = 10 cm

Sample Standard Deviation (s) = 2.4 cm

Sample Size (n) = 36

$$T = \frac{(\bar{x} - \mu)}{\left(\frac{s}{\sqrt{n}}\right)} =$$

T-test statistic sentence: The sample mean is _____ number of standard errors (above or below) the population mean in the null hypothesis.