Time Frame: 50 minutes

Subject Matter: Z Test TELL ME

Objective: TSWBAT test means for large samples, using the z test.

Standards: DA – 4.10

 Materials: PowerPoint Presentation, Calculator, and Worksheets

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Presentation of Information

The teacher will discuss the following:

* The **z test** is a statistical test for the mean of the population. It can be used when $n\geq 30$.

The formula for the z test is

 $z= \frac{\left(\overbar{x}- μ\right)}{\left({σ}/{\sqrt{n}}\right)}$

where

 $\overbar{x}=mean of the sample $

 $μ=hypothesized population mean$

 $σ=population standard deviation$

 $n=sample size$

* Five steps for solving hypothesis – testing problems.
	1. State the hypothesis and identify the claim.
	2. Find the critical value(s).
	3. Compute the test value.
	4. Make the decision to reject or not reject the null hypothesis.
	5. Summarize the result.

Example 1:

A researcher reports that the average salary of assistant professors is more than $42,000. A sample of 30 assistant professors has a mean salary of $43, 260. At $α=0.05$, test the claim that assistant professors earn more than $42,000 a year. The standard deviation of the population is $5,230.

Solution:

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision.

STEP 5: Summarize the result.

Example 2:

A researcher claims that the average cost of men’s athletic shoes is less than $80. He selects a random sample of 36 pairs of shoes from a catalog and finds the following costs (in dollars). (The costs have been rounded to the nearest dollar.) Is there enough evidence to support the researcher’s claim at $α=0.10$?

 60 70 75 55 80 55

 50 40 80 70 50 95

 120 90 75 85 80 60

 110 65 80 85 85 45

 75 60 90 90 60 95

 110 85 45 90 70 70

Solution:

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision. STEP 5: Summarize the result.

Example 3:

The Medical Rehabilitation Education Foundation reports that the average cost of rehabilitation for stroke victims is $24,672. To see if the average cost of rehabilitation is different at a particular hospital, a researcher selected a random sample of 35 stroke victims at the hospital and found that the average cost of their rehabilitation is $25,226. The standard deviation of the population is $3,251. At $α=0.01$, can it be concluded that the average cost of stroke rehabilitation at a particular hospital is different from $24,672?

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision. STEP 5: Summarize the result.

Example 4:

A researcher wishes to test the claim that the average age of lifeguard in Ocean City is greater than 24 years. She selects a sample of 36 lifeguards and finds the mean of the sample to be 24.7 years, with the standard deviation of two years. Is there evidence to support the claim at $α=0.05$?

Solution:

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision. STEP 5: Summarize the result.

Example 5:

A researcher claims that the average wind speed in a certain city is 8 miles per hour. A sample of 32 days has an average wind speed of 8.2 miles per hour. The standard deviation of the sample is 0.6 miles per hour. At $α=0.05$, is there enough evidence to reject the claim?

Solution:

STEP 1: State the hypothesis and identify the claim.

STEP 2: Find the critical value.

STEP 3: Compute the test value.

STEP 4: Make the decision. STEP 5: Summarize the result.