

Problem 1. Les Ismore had the idea that intense intellectual effort would affect the level of blood cholesterol but did not know how much. Ismore had data from a huge group where $\mu = 150$ and $\sigma = 16$. A group of 36 heavy thinkers had a mean level of 156 with $s = 12$. Was Les correct in this assumption?

1. What is your research hypothesis?

Intense intellectual effort will affect the level of blood cholesterol.

2. What is H_0 ?

Intense intellectual effort will not affect the level of blood cholesterol

3. What is H_a ?

Intense intellectual effort will affect the level of blood cholesterol.

4. Is this a one or two-tailed test?

Two

5. What is the significance level and its critical value of Z?

$p < .05, CV = 1.96$

6. What is your best estimate of the population σ ?

16

7. What is the Standard error of the mean?

$$\frac{16}{\sqrt{36}} = 2.667$$

8. What is your calculated statistic?

$$Z = \frac{156-150}{2.667} = 2.25$$

9. What is your conclusion?

Reject the Null hypothesis. Intense intellectual effort increases the level of blood cholesterol.

Problem 2. Sammy Quaver thinks that listening to Barry Manilow music while studying will affect students' performance on the Graduate Record Examinations but does not know whether the listening will distract students making their studying less effective, or if it will improve studying by acting as 'white noise' blocking out other distracting sounds. The GRE has the following statistical properties: $\mu = 500$ and $\sigma = 100$. Using a sample of 121 students who listened to Barry Manilow while preparing for the GRE, Quaver found that the group obtained a mean score of 460 with a standard deviation of 68.2. What conclusion can you draw from these data?

1. What is your research hypothesis?

Listening to Barry Manilow music while studying will affect GRE scores.

2. What is H_0 ?

Listening to Barry Manilow music will not affect GRE scores.

3. What is H_A ?

Listening to Barry Manilow music will affect GRE scores.

4. Is this a one or two-tailed test?

Two

5. What is the significance level and its critical value of Z?

$p < .05, CV = 1.96$

6. What is your best estimate of the population σ ?

100

7. What is the Standard error of the mean?

$\frac{100}{\sqrt{121}} = 9.09$

8. What is your calculated statistic?

$\frac{460-500}{9.09} = -4.40$

9. What is your conclusion?

Reject the null hypothesis. Listening to Barry Manilow music while studying for the GREs significantly lowers the scores.

Problem 3. Bull Phrogg was interested in the effects of a drug that would reduce the amount of sleep people required. Phrogg knew that the average number of hours required for most people is 8 hours; the standard deviation is .72 hours. Using a sample of 36 people the researcher who took the drug, Bull found that the mean amount of time they needed to sleep each night was 7.7 hours. Is there any evidence that the drug worked?

1. What is Null Hypotheses H_0 ?

The drug will not reduce the amount of sleep people need..

2. What is Alternative hypothesis, H_A ?

The drug will reduce the amount of sleep people need.

3. Is this a one or two-tailed test?

One

4. What is the significance level and critical value or the test?

$p < .05, CV = 1.64$

5. What is the sampling distribution?

z

6. What is the standard error?

$$\frac{.72}{\sqrt{36}} = .12$$

7. What is Z?

$$\frac{7.7 - 8.0}{.12} = -2.50$$

8. What is your conclusion?

Reject the null hypothesis. The drug significantly reduces the amount of sleep a person needs.