AS2 (Assignment 2, Unit 4): Computing the Z-test Statistic

Research Scenario #1

A researcher hypothesizes that zylex, a new antidepressant, will affect concentration. It is known that scores on a standardized concentration test is normally distributed with a μ= 50 and a σ= 12. A random sample of n=16 participants, aged 19-35, are chosen from the State of New Jersey. The sample is put on a six month dosage plan of zylex. After six months, all the participants are given a standardized concentration test. The researcher records the data and calculates a sample mean of M=56. Are the data sufficient to conclude that the drug, zylex, does have an effect on concentration?

Based on the above research scenario, please answer the following questions:

1. Name the population: _The entire state of New Jersey.

2. Name the sample: 16 participants from the state of New Jersey.

3. What is the independent variable? Zylex (antidepressant)_____

4. What is the dependent variable? Concentration_____

5. What is the appropriate hypothesis test? _Z-test_____

6. What two means are you comparing in this test? The Population mean (50) and the Sample mean (56)_____

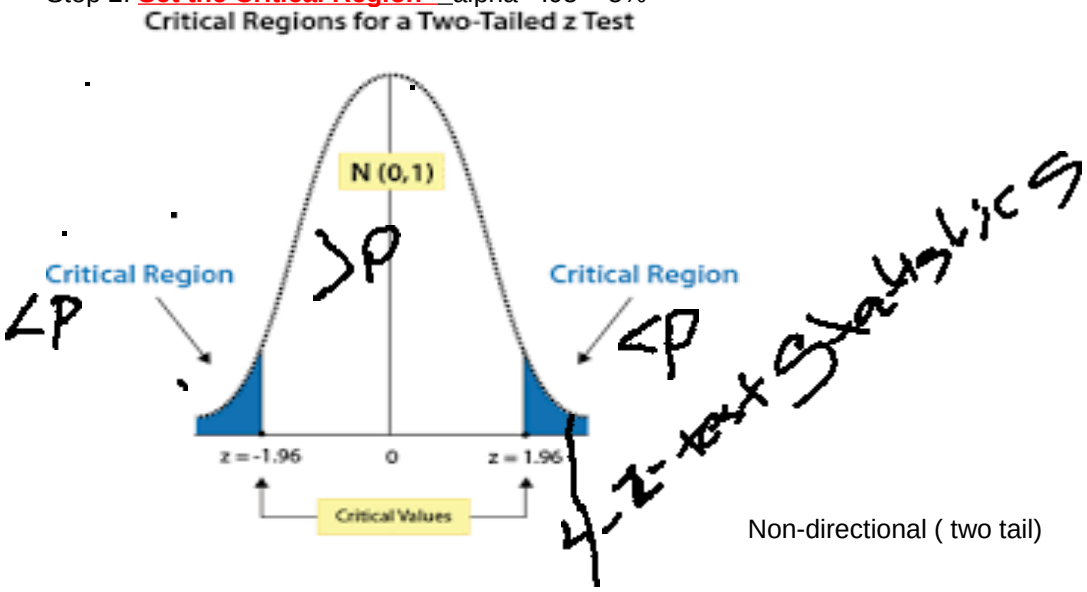
7. Please calculate the appropriate hypothesis test using all four steps:

Step 1: **Name the Hypothesis**

Ho - Zylex an antidepressant Will Not have an effect on concentration.

H1- Zylex an antidepressant Will have an effect on concentration.

Step 2: **Set the Critical Region~** _alpha =.05 = 5%



Non-directional (two tail)

Step 3: **Do the Math ~** Z = 2

Step 4: **Make a decision ~** Reject Ho, the null hypothesis.

Write the statistical statement for your results: _Z = 2, p<.05

Interpret your results (relating back to the hypothesis): Our study show that Zylex the antidepressant did have an effect on concentration. The data were significant

Is there a probability of Type I error? Yes __x____ No _____

If yes, what is the probability of a Type I error? ___5%, which is 2.5% for each side_____

Is yes, how could you have decreased that probability? _by decreasing the alpha level.

Is there a probability of Type II error? Yes_____ No__X____

If it is appropriate, please calculate effect size: Answer:_____

Research Scenario #2:

A researcher wanted to study the effect of alcohol on reaction time. She hypothesized that alcohol will INCREASE reaction time (participants will take longer to react). She selected a sample of n= 36 participants from Rutgers University. The 36 participants each consumed a 6-ounce glass of wine. Thirty minutes later, the researcher measured each participant's reaction time, using a standardized driving simulation task for which the regular population has a $\mu = 400$ msec reaction time with a $\sigma = 48$. The reaction time mean for the sample was M= 412 msec. Are the data sufficient to conclude that the alcohol significantly increased reaction time?

Based on the above research scenario, please answer the following questions:

1. Name the population: _Rutgers University_____
2. Name the sample: __36 participants from Rutgers University

3. What is the independent variable? _Alcohol_____

4. What is the dependent variable? Reaction Time_____

5. What is the appropriate hypothesis test? __Z- Test_____

6. What two means are you comparing in this test? __Population and sample

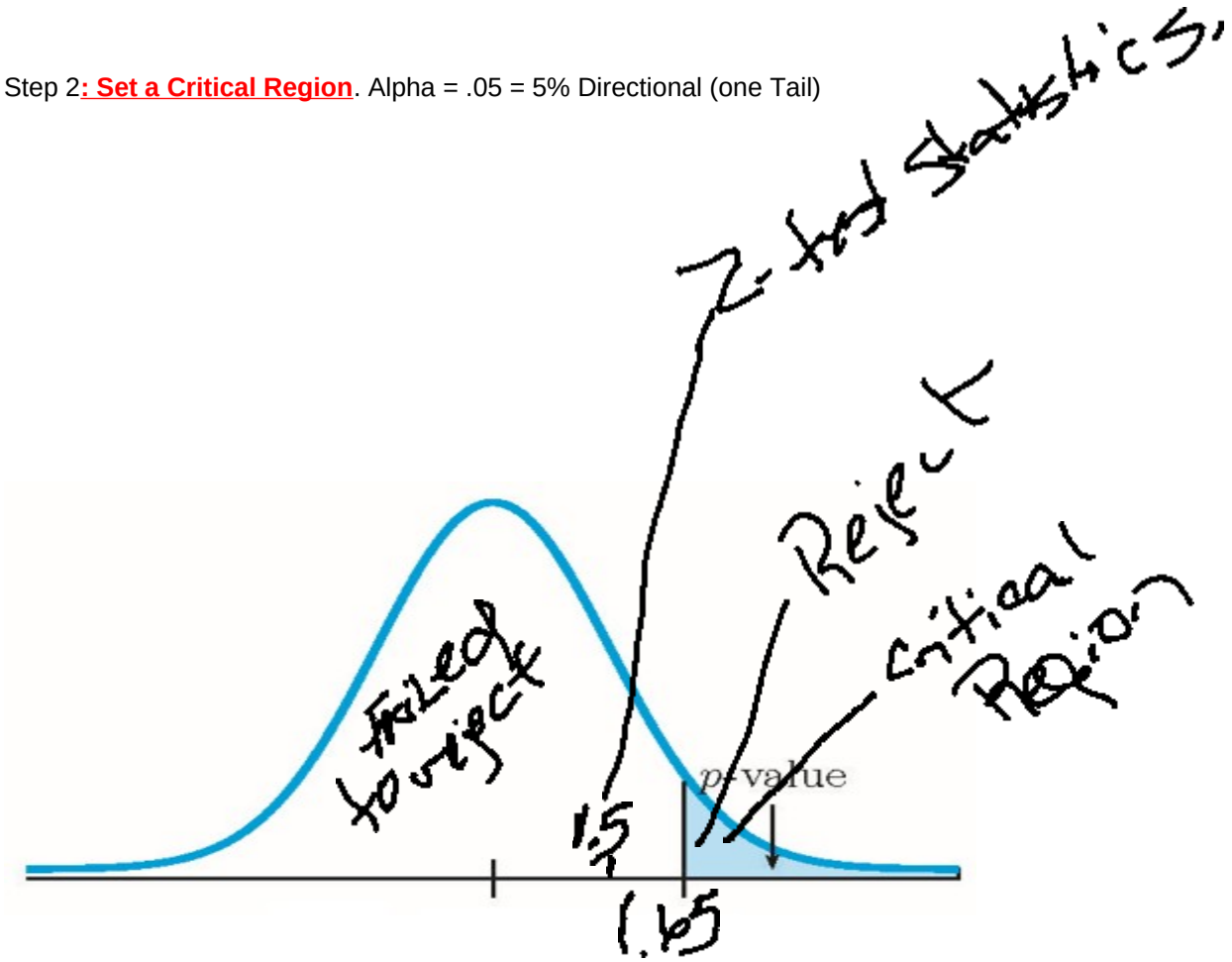
7. Please calculate the appropriate hypothesis test using all four steps:

Step 1: **Name the Hypothesis**

Ho ~ Alcohol Will Not INCREASE reaction time of participants.

H1 ~Alcohol Will INCREASE reaction time of participants.

Step 2**: Set a Critical Region**. Alpha = .05 = 5% Directional (one Tail)



Step 3: **Do The Math** Z=1.5

Step 4: _**Make an Decision~** failed to reject the null Hypothesis (Ho)

_____

Write the statistical statement for the results: _Z = 1.5, P>.0

Interpret your results (relating back to the hypothesis): Our study supports that Alcohol Did not INCREASE reaction time. The data were significant._

Is there a probability of Type I error? Yes ____ No___x__

Is there a probability of Type II error? Yes __x__ No____

If appropriate, please compute effect size: Answer: d= .025