**1. 8 Steps in the Process for Hypothesis Testing**

**Step 1**

Setup the null and alternative hypothesis. Instead of trying to prove what we want, we want to disprove the opposite argument. As such, the null hypothesis will be the case that we do not want to win. The alternative hypothesis will be the case we do want to prevail.

**Step 2**

Use the sample evidence in an attempt to defeat the null hypothesis.

**Step 3**

Stating the test considerations will be needed so that the appropriate test is selected for the particular situation.

**Step 4**

Considering the implications of Type I and II errors is necessary for stating the required strength of evidence in this step.

**Step 5**

Computing the test statistic will allows us to have a benchmark by which we can compare to what we are trying to disprove in the null hypothesis. We can either use a p-value or a critical value.

**Step 6**

Interpret the p-value or critical value in the context of the problem.

**Step 7**

We can now make a statement about the hypothesis as we compare our p-value or critical value to the significance level at which we are testing.

**Step 8**

Stating the final conclusion will give a clear statement on our findings.

**2. State the hypotheses.**

H0: µ ≥ $75,000

H1: µ < $75,000

This will be a left-tailed test. We want our test statistic to be less than the critical value so that we can reject H0. In other words, if our test statistic is more extreme than our critical value, it will fall in the critical region with is the area to the left of the curve at the critical value.

**3. Deciding on the Test and Finding the Test Statistics Value**

We use the T critical value in a situation where the population standard deviation is not known or the sample size is small. In our scenario, we do not know the population standard deviation.

**4. Critical value and Rejection Region**

The critical value is the point at which we compare our test statistic so that we can make the determination as to accept or reject our null hypothesis. For this example, because , we:

Reject H0 if p-value < 0.05

The rejection region is the area of the curve to the left of the curve at p = .05.

**5. Critical value approach**

We use the T critical value in a situation where the population standard deviation is not known or the sample size is small. In our scenario, we do not know the population standard deviation. As such, we compute the test statistic as follows using :

We find t to be:

t\* = (71879.40-75000)/(23367.36/√364)

t\* = -3120.60 / 1224.78

t\* = -2.55

We use the α=0.05 and the degrees of freedom at 363 using the =T.INV(.05, 363) formula to find tcritical to be:

tcritical = -1.65

For the left-tailed test, if t\* < tcritical, we reject H0. Since the t statistic (-2.55) < -1.65, we can reject the null hypothesis and:

We can conclude the average salary for all jobs in Minnesota is less than $75,000.

**6. P-value approach**

We use the T critical value in a situation where the population standard deviation is not known or the sample size is small. In our scenario, we do not know the population standard deviation. Further, we assume the data is normally distributed. As such, we compute the test statistic as follows using :

We find t\* to be:

t\* = (71879.40-75000)/(23367.36/√364)

t\* = -3120.60 / 1224.78

t\* = -2.55

Using Excel we use =T.DIST(F27,F26, TRUE) to find:

p-value = .0056

For this example, because , we:

Reject H0 if p-value < 0.05

The rejection region is the area of the curve to the left of the curve at p = .05. Since the p-value (0.0056) < 0.05, we can reject the null hypothesis and:

We can conclude the average salary for all jobs in Minnesota is less than $75,000.

The results from the p-value method match with the critical value method.