Problem 1 *Conduct nonparametric tests of hypothesis using the 5-step process to test to see if there is any difference within the annual mean earning wages of Hispanic and Non-Hispanic workers.*

Step 1: State the Null Hypothesis and Alternate Hypothesis

H_o: No significant difference within the annual mean earning wages of Hispanic and Non-Hispanic.

H_1: A significant difference does exist within the mean earning wages of Hispanic and Non-Hispanic.

Step 2: Select a Level of Significance that is used to find the critical value

This means to set an appropriate alpha value α. We will use a(alpha) =0.05, which is typical

Step 3: Identify the test Statistic

The test statistic is something standard you will find in most test books:

$$t = \frac{\overline{x} - \mu_0}{\sigma/\sqrt{n}}$$

is the form given for when we know the population standard deviation (σ) of the population. μ_0 is the null hypothesis mean and $\overline{x}$ is the mean found and being tested

while n is the number of measurements the test $\overline{x}$ is based on.   If the population standard deviation is not known, substitute the sample deviation s for σ.

Step 4: State the decision Rule

Examine the area under the normal curve and get a p-value for $P(z > t)$. Reading from a z-score table you find a value which you have to add .5 to, since this is a one-tailed test for the region beyond the z-score, as indicated by the fact we are checking for $\mu > \mu_0$. This,

$$0.5 + P(z > t).$$

If this value is greater than $> \alpha = 0.05$, we cannot reject the null hypothesis and we conclude that true mean for West Cost breakfasts is higher than $7.58.

Step 5: Take a sample and arrive at a decision

Here we need to come up with some actual numbers. Let's say you have some data and discover that a recent survey indicated that the average wage for all races was $75,800 with a standard deviation of $4,200. It is being tested if average wages for Non-Hispanics were higher than $75,800. A sample of 81 Non-Hispanic workers had an average wage cost of $76,500. At a(alpha) =0.05 what is the test value and is what is the decision?

Null hypothesis (H_0): $\mu = \$75,800$

That is, the null hypothesis is that sample of the 81 workers is from a population with the same mean

Alternative hypothesis (H_1): $\mu > \$75,800$

That is, the possibility that the Non-Hispanic workers really are earning more.

The test statistic:

$$z = \frac{76500 - 75800}{4200/\sqrt{81}}$$
$$= 1.5$$

Your **test statistic** is 1.5.

This is where the $\alpha = 0.05$ comes in. First, we need to examine the area under the normal curve and get a a p-value for $P(z > 1.5)$. Reading from my z-score table I find 0.4332 which I have to add $.5$ to, since this is a one-tailed test for the region beyond the z-score, as indicated by the fact we are checking for $\mu > \$75,800$. Thus,

$$P(z > 1.5) = 0.5 + .4332$$
$$= 0.933\,2$$

Since $0.933\,2 > \alpha = 0.05$, we cannot reject the null hypothesis and we conclude that truly Non-Hispanic workers are making a higher average wage.