Stat Practice # 8 **Date:_________** **Section: _______** **Name: ___________________________**

Help can be found in class lecture, topics review or related PowerPoints

- **a)** What do we estimate? Population mean (μ) or sample mean ($\bar{x}$) or both?
- **b)** Why do we need to estimate? Cite some reasons?
- **c)** What is the point estimate?
- **d)** What is the confidence level?
- **e)** What is the criteria of t-distribution?
- **f)** Under what condition we use t-distribution?
- **g)** What is the formula for degree of freedom $df = ?$
- **h)** What is the margin of error and what are three different possible formulas for it?
- **i)** Where you can find the z table and under what condition you will be using this table?
- **j)** Where you can find the t table and under what condition you will be using this table?
- **k)** What is the width of a confidence interval?
- **l)** How can we use the upper and lower boundaries of a confidence interval to find point estimate?
- **m)** How can we use the error bounds of a confidence interval to find margin of error?
- **n)** How to use **TI calculator** to find the boundaries of a confidence interval when we use **normal distribution**?
- **o)** How to use **TI calculator** to find the boundaries of a confidence interval when we use **t-distribution**?

YouTube TI Calculator: https://www.youtube.com/watch?v=pjMRC8q6HyE **General introduction**
YouTube TI Calculator: https://www.youtube.com/watch?v=H3uU-Tx2Yq0 **General introduction**
YouTube TI Calculator: https://www.youtube.com/watch?v=iE8v2RYAnJg Using t-distribution with data
YouTube TI Calculator https://www.youtube.com/watch?v=gR8pHFZ4pYw Using t-distribution with data

For the following problems decide to z or t value or neither?

1. **1)** Sample size $n = 10$, $\sigma = 4$ and the population is normally distributed?
2. **2)** Sample size $n = 10$, $s = 4$ and the population is normally distributed?
3. **3)** Sample size $n = 28$, $\sigma = 4$ and the population is normally distributed?
4. **4)** Sample size $n = 100$, $s = 4$ and the population is normally distributed?
5. **5)** Sample size $n = 4$, $s = 100$ and the population is normally distributed?

1. Fill in the blanks with on of the following: *increases, decreases,* or *stays the same* where $E = z\frac{\sigma}{\sqrt{n}}$.

a) As the sample size (n) increases, the margin of error (E) ______________.

b) As the confidence level (C) increases, the margin of error (E) ________________.

c) As the standard deviation (σ) increases, the margin of error (E) __________________.

A) $\bar{x} \pm z_{\alpha/2}\left(\frac{\sigma}{\sqrt{n}}\right)$ **B)** $\bar{x} \pm z_{\alpha/2}\left(\frac{s}{\sqrt{n}}\right)$ **C)** $\bar{x} \pm t_{\alpha/2,df}\left(\frac{s}{\sqrt{n}}\right)$

2. A company that produces white bread is concerned about the distribution of the amount of sodium in its bread. The company takes a simple random sample of **100** slices of bread and computes the sample mean to be **103** milligrams of sodium per slice. Construct a **95%** confidence interval for the unknown mean sodium level assuming that the population standard deviation is **10** milligrams.

$E =$ $\mu =$ $101.04 < \mu < 104.96$

3. A company that produces white bread is concerned about the distribution of the amount of sodium in its bread. The company takes a simple random sample of **16** slices of bread and computes the sample mean to be **103** milligrams of sodium per slice. Construct a **95%** confidence interval for the unknown mean sodium level assuming that the sample standard deviation is **10** milligrams.

$E =$ $\mu =$ $97.76 < \mu < 108.33$

4. The football coach randomly selected eight players and timed how long it took to perform a certain drill. The times in minutes were: 10, 6, 8, 7, 6, 5, 7, 8. Assuming that the times follow a normal distribution, find a 95% confidence interval for the population mean. $\bar{x} =$ $s =$

$E =$ $\mu =$ $5.83 < \mu < 8.42$

5. A company that produces white bread is concerned about the distribution of the amount of sodium in its bread. The company takes a simple random sample of 36 slices of bread and computes the sample mean to be 103 milligrams of sodium per slice. Construct a 95% confidence interval for the unknown mean sodium level assuming that the sample standard deviation is 10 milligrams.

$E =$ $\mu =$ $99.73 < \mu < 106.27$

6. You work for a consumer advocate agency and want to find the mean repair cost of a washing machine. In the past, the standard deviation of the cost of repairs for washing machines has been $17.50. As part of your study, you randomly select 40 repair costs and find the mean to be $100.00. Calculate a 90% confidence interval for the population mean.

$E =$ $\mu =$ $95.45 < \mu < 104.55$

7. The actual time it takes to cook a ten-pound turkey is a normally distributed. Suppose that a random sample of 19 ten pound turkeys is taken. Given that an average of 2.9 hours and a standard deviation of .24 hours was found for a sample of 19 turkeys, calculate a 90% confidence interval for the average cooking time of a ten-pound turkey.

$E =$ $\mu =$ $2.80 < \mu < 2.96$

8) On day two of a study on body temperatures, 106 temperatures were taken. Suppose that we only have the first 25 temperatures to work with. The mean and standard deviation of these 25 scores were 98.44°F and 0.30°F, respectively. Construct a 95% confidence interval for the mean of all body temperatures.

$E =$ $\mu =$ $98.32 < \mu < 98.56$

9) Given the estimated mean of a population as $40 < \mu < 68$, to find $\bar{x}$ and E **Ans:** $\bar{x} = 54$ and $E = 14$

10) Given the estimated mean of a population as $84.56 < \mu < 98.36$, to find $\bar{x}$ and E **Ans:** $\bar{x} =$ 91.46 and $E = 6.9$