Guided Notes – 8.3 Estimating a Population Mean CI

1. Inference about population proportions (____) based on _____ variables.

    - Proportions are _____.

2. Inference about population means (____) based on _____ variables.

    - Means are _____.

3. In most real world problems, we do **NOT** know the population _____ (µ) or
    _____(σ), therefore we **cannot use** the *Z-statistic* for
    inference for means.

    - **We will learn a new test statistic in this chapter that will always be used for inference tests with means called the *t-Statistic***

    - You will **NEVER** be asked to do a *"1 Sample Z-interval for a population mean".* We never know the population standard deviation (σ), so this is a useless test.

Estimating Sample Sizes for Means

4. What is the formula to **calculate the sample size for means**?

    a)   What statistic will be used to calculate **the sample size for means**? _____

    b) What critical value will be used to calculate **the sample size for means**? _____

    c) What conditions are required?

        1. R_____

        2. I_____

        3. N_____

        4. Plus **you must know** the population _____(σ)

5. Describe the three steps for choosing a sample size for a desired margin of error when estimating μ.

6. Complete the Check Your Undertanding "Monkeys" -- page 501-502.

1) Define population parameter	μ=
2) Get information to estimate the sample size	CL= _____ z*= _____ σ= _____ ME= _____
3) Use formula used to determine the sample size *n* for a population mean:	$z*\dfrac{\sigma}{\sqrt{n}} \leq ME$. Solve for *n*.
4) Substitute numbers and clearly show all steps to calculate the sample size *n*	
5) Always round _____ _____whole number to ensure ME is met.	We need to sample _____

7. It is the size of the _____ that determines the margin of error. The size of the

    _____ does not influence the sample size we need.   This is true as long

    as the population_____.

8.3 Estimating a Population Mean when "σ KNOWN"

8. What is the standardized value of the z-statistic?

    a) See Figure 8.11 to understand this new z-statistic

Sketch the sampling distribution of $\bar{x}$ when the normal condition is met and **σ** is known.	Compare the distributions	Sketch the standard normal distribution .

    b) When we don't know "**σ,**" we estimate it using the _____

       _____; creating a **new statistic called the "t-statistic."**

9. SKIP "Bingo" Actvity

10. What is the fomula for the "**t-statistic**"?

    a) How do you calculate the degrees of freedom for a t distribution?

See Figure 8.13 to understand the t-statistic

b) Sketch normal distribution;t-distrib. with df=9; and t-distrib. with df=2.	c) Describe the similarities between a standard normal distribution and a t distribution.
	d) Describe the differences between a standard normal distribution and a t distribution.
	e) What happens to the t distribution as the degrees of freedom increase?

11. How do you find the critical value t* using TI84? You only need to know how to use Table B if you have a TI83.

12. Check Your Understanding -- page 507 (use TI84, sketch the graph, answers in back of book)

a)	b)	c)

13) What is the formula for the ***standard deviation of the sampling distribution*** of the sample mean $\overline{x}$?	14) What is the ***standard error*** of the sample mean $\overline{x}$?

> **General form to calculate a confidence interval is on the Green Sheet:**
> **statistic ± (critical value) ● (standard deviation of the statistic)**

15. What is the formula for a ***1-sample t- interval for a population mean?***

    a) What statistic will be used to calculate this confidence interval? _____

    b) What is the critical value? _____ with df=_____

    c) What part of this formula is the margin of error (ME)? _____

16. What conditions are required for a ***1-sample t- interval for a population mean***?

    - R_____
        - _____
        - _____

    - N_____
        - _____

        - _____

    - I_____
        _____
        _____
        _____

17. Walk through example "Video Screen Tension."
    - You do not need to write the problem.
    - Enter the data and use your calculator to replicate all steps. See "Technology Corner" page 514.
    - **Your Notes**:

18. "Auto Pollution" example is optional. **<u>Your Notes</u>**:

19. What is a "Robust" procedure?   And, when are t-procedures NOT robust?

20. Describe the 2 different normal conditions when using t-procedures:

- _____ (n<15 and n<30)

  _____

  _____

  _____

  _____

- _____ (n≥30)

  _____

  _____

  _____

  _____

21. Walk through example "People, Trees, and Flowers." **<u>Your Notes</u>**: