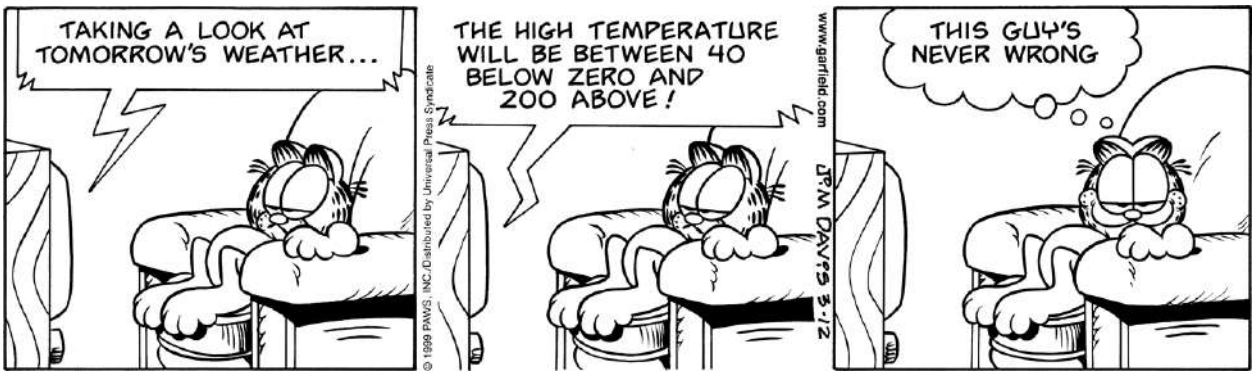
Chapter 8: Estimating with Confidence

Key Vocabulary:

- point estimator
- point estimate
- confidence interval
- margin of error
- interval
- confidence level
- random
- normal
- independent
- four step process
- level C confidence interval
- degrees of freedom
- standard error
- one -sample z interval
- t distribution
- t-procedures
- one-sample t interval
- robust



8.1 Confidence Intervals: The Basics (pp.615-643)

1. A *point estimator* is a statistic that…

2. The value of the point estimator statistic is called a _____ and it is our "best guess" at the value of the _____.

3. **Example** "From Batteries to Smoking" Answer parts "a" and "b."

   a) Point Estimator is_____ (notation is _____) for the population mean (μ).
      - The Point Estimate is_____

   b) Point Estimator is_____ (notation is _____) for the population proportion (p).
      - The Point Estimate is_____

4. **Example** "The Mystery Mean" we will do as an activity next class.

5. Summarize the facts about *sampling distributions* learned in chapter 7:

sampling distributions ***for means***	*sampling distributions* ***for proportions***
• **Shape**	• **Shape**
• **Center**	• **Center**
• **Spread**	• **Spread**

6. "**The Big Idea…** is that the _____of $\bar{x}$ tells us how close to _____ the _____ ($\bar{x}$) is likely to be.
   - Or, said a different way… "How close ___ is likely to be to the _____ population _____ (___).

7. A **Confidence Interval** for a parameter has 2 parts : **"estimate ± margin of error"**
   a) $\bar{x}$ and $\hat{p}$ are examples of the _____.
   b) Define margin of error:

   c) The confidence level C is a _____. That is, in **C%** of all possible _____, the method would yield an _____ that captures the _____ population _____.

8. What is the difference in interpretation between **Confidence Interval** and **Confidence Level**?
   a) ***Interpret a Confidence Level (CL)*** : "To say that we are 95% confident is shorthand for …..

   b) Explain how to interpret a ***Confidence Interval (CI).***

   c) The ***confidence level(CL)*** does **NOT** tell us the chance that a particular confidence interval captures the population parameter because the _____ is not a probability. **What does CL tell us**? And explain "***plausible values****?*"

9. Sketch and label a *95% confidence interval* for the standard normal curve N(0,1). Label the mean, **±**3 standard deviations, shade the *95%* confidence area, and confidence interval.

- In a sampling distribution of $\bar{x}$, why is the interval of numbers between $\bar{x} \pm 2s$ called a *95% confidence interval*? HINT: Think Empirical Rule.

10. General form to calculate a confidence interval is on the **Green Sheet**:

statistic ± (critical value) • (standard deviation of the statistic)

statistic ± _____

a) From this formula, what is the **"margin of error?"**

b) What does the **"critical value"** depend on?

c) What does the **"standard deviation"** depend on?

11. What happens when the **sample size (n)** increases?

12. When the **confidence level** increases, what happens to the **confidence interval**?

●——————————● **[_____% CI]**

●————————————————————————● **[_____% CI]**

13. Explain the two conditions when the margin of error gets smaller.

#1 _____

#2 _____

14. State the 3 **conditions for constructing a confidence interval** for population parameters *p* or μ .

- Random

- Normal

- Independent

19. What are the two important reminders for constructing and interpreting confidence intervals?

#1 _____

#2 _____