MATH 3307
Lesson 26

Margins of Error and Estimates

What is estimation?

A **point estimate** is a single value that has been calculated from sample data to estimate the unknown population parameter.

Commonly Used Symbols

Population Parameter	Sample Statistic
p - Population Proportion	$\hat{p}$ - Sample Proportion
μ - Population Mean	$\bar{x}$ - Sample Mean
σ - Population Standard Deviation	s – Sample Standard Deviation

Confidence

Suppose we would like to make an estimate of a population parameter based on a sample statistic. A **confidence interval** is a range of possible values that is likely to contain the unknown population parameter that we are seeking.

First, we must have a **level of confidence**. Then, based on this level, we will compute a **margin of error** (we will discuss how to compute this in the next sections). Last, we can say that we are --% confident that the true population parameter falls within our confidence interval.

Formula for a confidence interval is: sample statistic ± margin of error

Example: Problem 11 from the text

Suppose the heights of the population of basketball players at a certain college are in question. A sample of size 16 is randomly selected from this population of basketball players and their heights are measured. The average height is found to be 6.2 feet and the margin of error is found to be ± 0.4 feet.

If this margin of error was determined with a 95% confidence level, find and interpret the confidence interval.

So, what does this interpretation really mean?
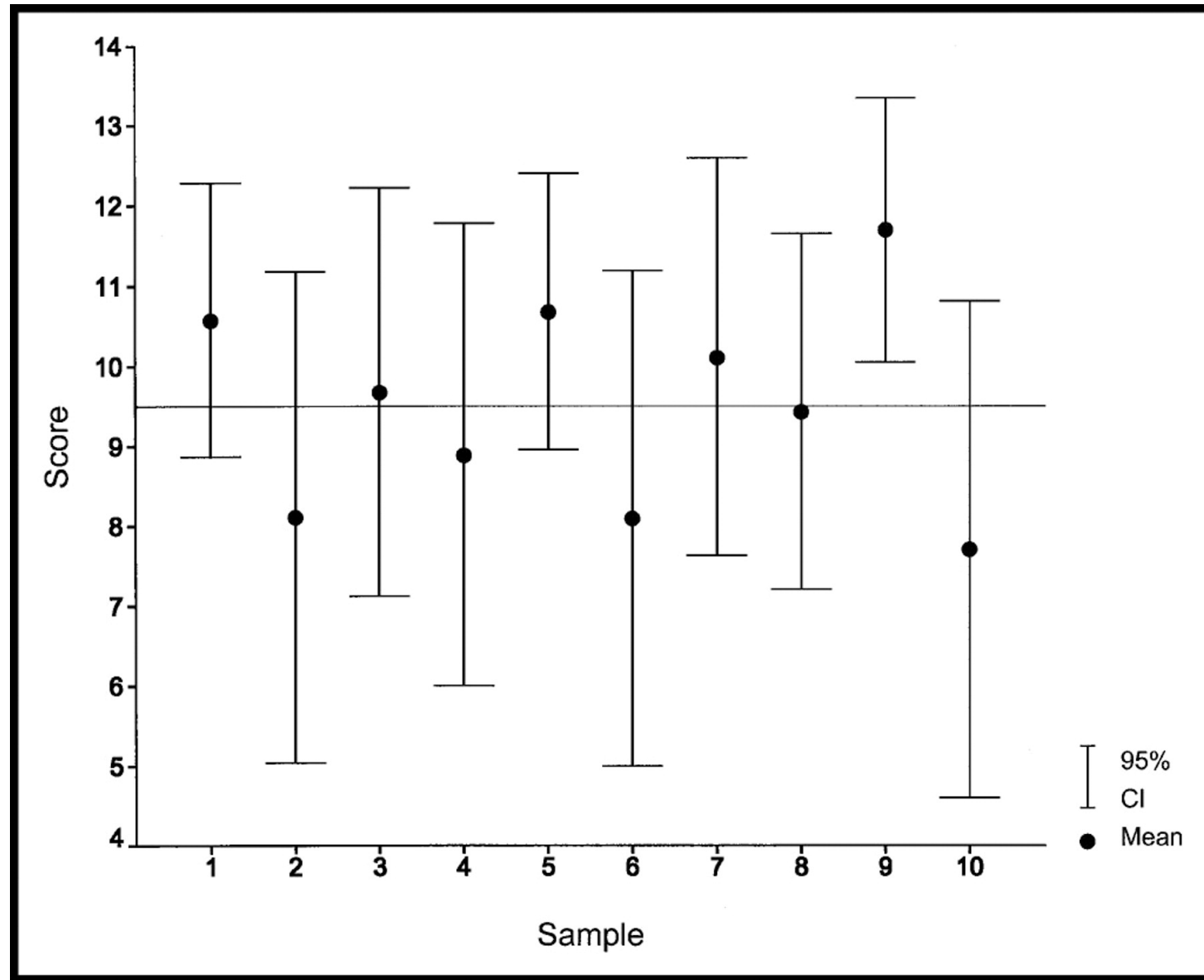
A study is conducted to determine the number of times a week a college student purchases coffee. A sample of 200 college students were surveyed, and it was determined that, on average, 12 cups of coffee per week were purchased, with a possible error of 2 cups. There was a 90% confidence level in this study.

Based on this study, what is mean number cups of coffee purchased by a college student in our sample?

In this study, what is the confidence interval?

What is the population mean?

What does the confidence level mean?