

Margin of Error and Estimates

7.1 Margin of Error and Estimates

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

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

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- 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 \pm margin of error

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Example:

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.

$$6.2 \pm 0.4$$

Confidence Interval $[5.8, 6.6]$

Interpretation of the interval:

We are 95% confident the true mean height of basketball players at that college is between 5.8 ft and 6.6 ft.

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Interpretation of the level of confidence:

- So, what does this interpretation really mean?

