

# Parameters & Statistic AND Margin of Error

**Day 3**

## What is a Parameter? Statistic?

**P**arameter: a value that represents a **p**opulation!  
(We usually don't know this!)

**S**tatistic: a value based on a **s**ample that is used to estimate a parameter.

## Why do we even get statistics?

Why do we get statistics instead of getting parameters?

- Getting data from a sample is much more convenient and cheaper than surveying all individuals in a population.

## New Stat Symbols

	<b>Population <u>Parameter</u></b>	<b>Sample <u>Statistic</u></b>
<b>Mean</b>	$\mu$	$\tilde{x}$
<b>Variance</b>	$\sigma^2$	$s^2$
<b>Std. Deviation</b>	$\sigma$	$s$
<b>Size</b>	$N$	$n$

## Parameter or Statistic?

60,000 members of the labor force were interviewed of whom 7.2% were unemployed.

## Parameter or Statistic?

A lot of bolts has a mean diameter of 2.5003 cm.

A 100 bearings are selected from the lot and have a mean diameter of 2.5009 cm.

2.5003?

2.5009?

## Parameter or Statistic?

A telemarketing firm in Los Angeles randomly dials telephone numbers. Of the first 100 numbers dialed 48% are unlisted. This is not surprising because 52% of all Los Angeles residential numbers are unlisted.

48%?

52%?

## What is the Margin of Error?

- When we get a statistic to represent our population, we cannot guarantee it is accurate. So, we develop a buffer around it in which we believe will contain our true population parameter.



## How do we find the Margin of Error (MOE)?

$$\text{MOE} = \frac{1}{\sqrt{n}} \quad \text{where } n = \text{sample size}$$

**Let's calculate Margin of Error!**

Given a sample space of 140, what would the margin of error be?

## Using the MOE we can create Confidence Intervals.

Taking that margin of error, we will add and subtract it from our statistic to find our “buffer”.

If the mean was 16 in the last example, What is our confidence interval???

*How would we report?*

We can confidently state that the true (mean/proportion) of \_\_\_\_\_ lies between \_\_\_\_\_ and \_\_\_\_\_.

## Example:

Suppose that 900 American teens were surveyed about their favorite event of the Winter Olympics. Ski jumping was the favorite of 20% of those surveyed.

Predict the proportion of All American teens who favor ski jumping.

How would you report this?

## What sample size produces a given Margin of Error?

If you want your margin of error to be 5%, what size sample will you need?

## How does sample size affect Margin of Error?

If your sample size is 400 and you wish to cut the margin of error in half, what will your new sample size be?

What do you notice?

## Find the Statistic and the Margin of Error!

Given a confidence interval of  $(46, 78)$ , what is the statistic?

What is the Margin of Error?