

# Sampling Distributions:

## Section 9.1

### Why Am I in AP Statistics Again?

Statistics is the science (and art) of learning from data.

Remember from the first week of class that there are two basic kinds of statistics:

**exploratory data analysis:** an informal and open-ended examination of data for patterns

**statistical inference:** follows strict rules and focuses on judging whether the patterns you found are the sort you would expect

## Does It Matter Which I Use?

Yes! Exploratory data analysis can be done with any data, but formal inference should only be used in certain situations.

Although experts disagree about how widely statistical inference should be used, they all agree that inference is most secure when we produce data through random sampling or randomized comparative experiments.

Because when we use chance to choose respondents or assign subjects, the laws of probability can answer the question “What would happen if we did this many, many times?”

## Where We've Been

In Chapters 1 – 4 we focused on exploratory data analysis where we developed tools and strategies for organizing, describing, and analyzing data.

In Chapter 5 we learned how to correctly collect or produce data through surveys, experiments, and observational studies.

In Chapters 6 – 8 we learned about probability.

## Where We're Going

The purpose of Chapter 9 is to prepare us for the study of statistical inference (Chapters 10 – 15) by looking at the distributions of some very common statistics - sample means and sample proportions.

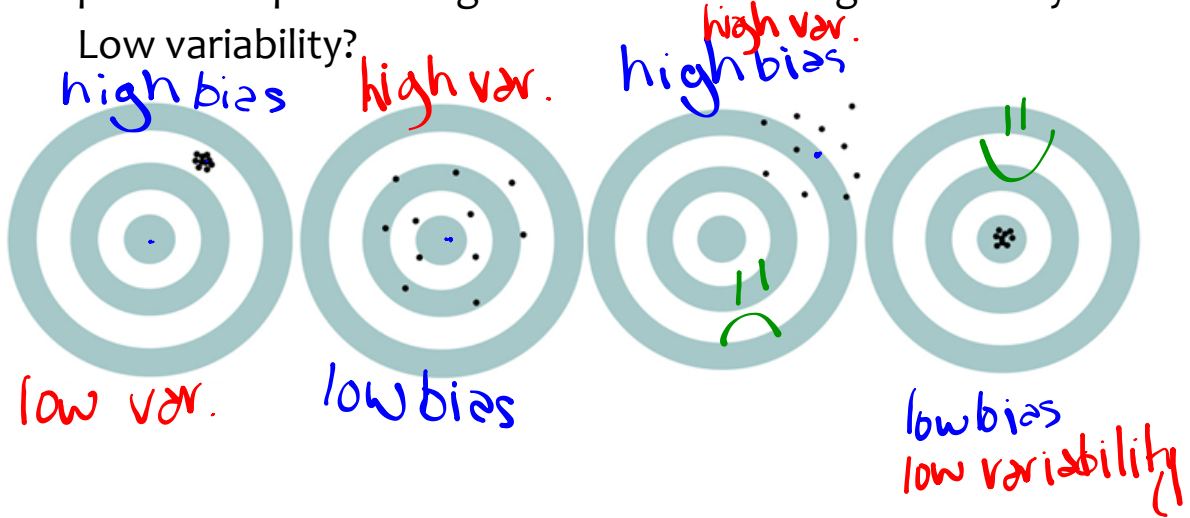
## Always Practice Safe Statistics

Because of sampling variability, we would never just collect data from a single sample and say that our sample statistic is equal to the population parameter. It may be close, but it may be very far off.

So how can we ever be sure that our sample statistic is a good estimator of our population parameter? Well, we can't, but we will learn how to be pretty confident during the next few chapters of our book.

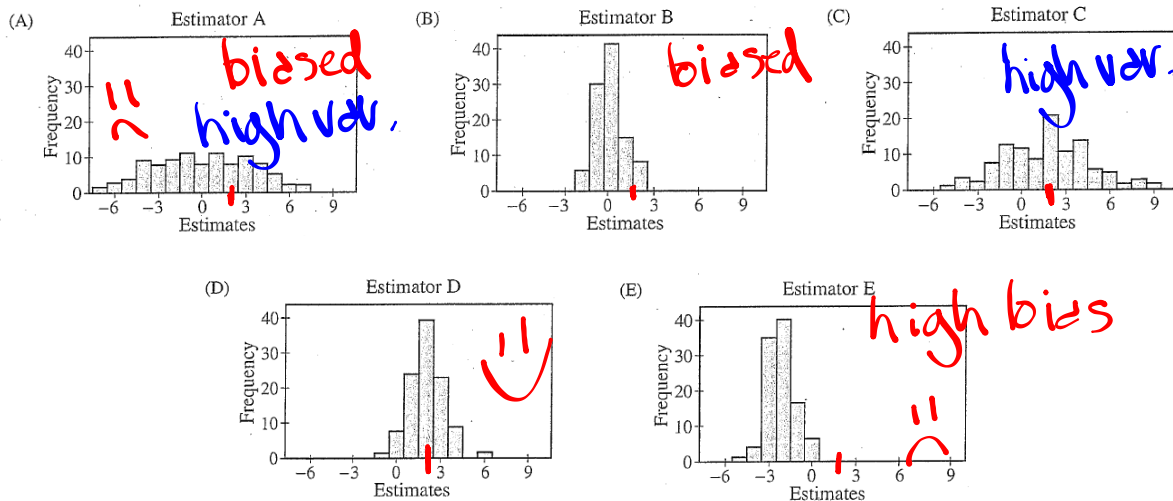
## Bias and Variability on the Dartboard

If the bullseye is the true population parameter and the arrows we throw are our sample statistics, which pictures represent high bias? Low bias? High variability? Low variability?



If the value of the population parameter is 2, which graphs are biased?

Which graphs are highly variable?



Assignment: pg. 568 #1, 2, 5ab, 8-13, 17 &  
Take 9.2 Notes

