

Monday, March 30: **Sampling Distributions**

Group Members: List the names of your group mates below.

1. Consider a population consisting of the following 5 students:

Name	Borough

a) List all possible samples of this population of size 3. (Hint: There are ten in all.)

	People in Sample	Proportion from Brooklyn
Sample 1		
Sample 2		
Sample 3		
Sample 4		
Sample 5		
Sample 6		
Sample 7		
Sample 8		
Sample 9		
Sample 10		

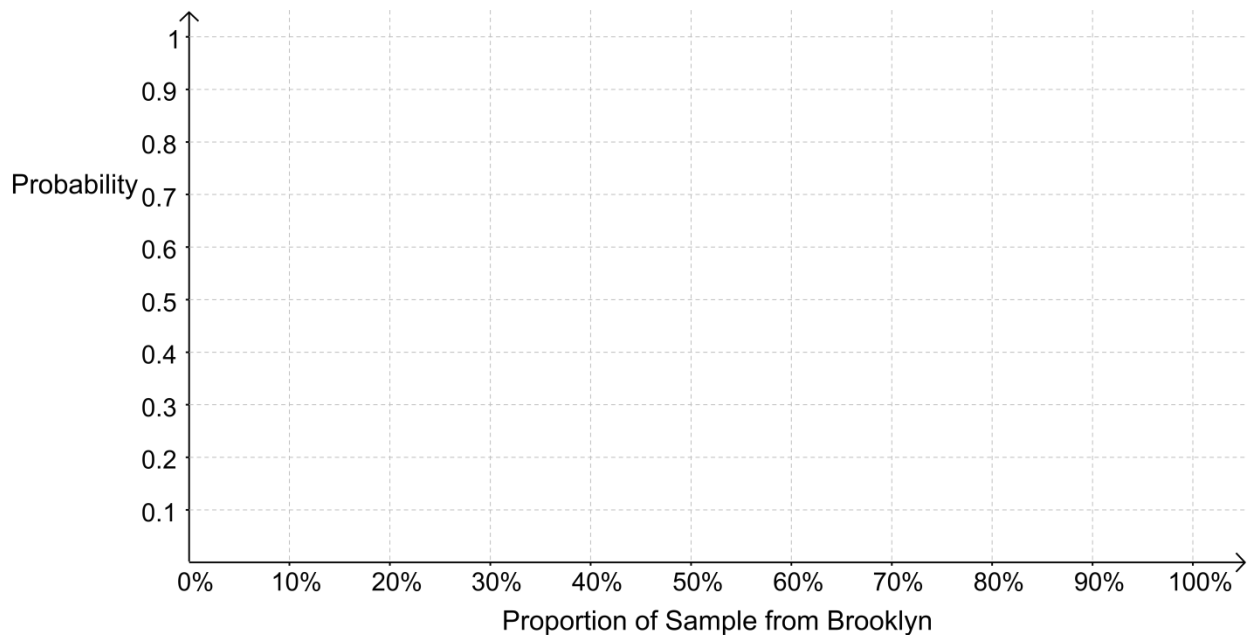
- b) The **parameter** p is the proportion of people in our population who are from Brooklyn.
What percentage of our population is from Brooklyn?

$$p =$$

- c) The **estimator** \hat{p} for each sample is the proportion of people in this sample who are from Brooklyn.
If we randomly selected a sample (using one of our sampling methods like **simple random sampling, cluster sampling, or stratified sampling,**) what is the probability that we randomly select a sample with $\hat{p} = 33\%$ (or $1/3$ of the respondents)?

- d) What is the probability that we randomly select a sample with $\hat{p} = 67\%$ (or $2/3$ of the respondents)?

- e) Fill in the chart below that shows the different probabilities of selecting a sample where 33% are from Brooklyn, 67% and so on.



- f) This probability distribution is called the _____ because it shows the probability that you will randomly select a sample with a certain estimator \hat{p} . Label the parameter p on the graph.
- g) Which estimator(s) are furthest from the parameter?
- h) Which estimator(s) are closest to the parameter?
- i) The **standard error** describes how imprecise our sampling is. It's basically asking how spread out the estimators are for the different samples. What concept from Statistics A could we use to measure how spread out the distribution is?
- j) The **bias** describes how far off the typical estimator is from the parameter. What concept from Statistics A could we use to measure how far off the typical sample is from the parameter?