

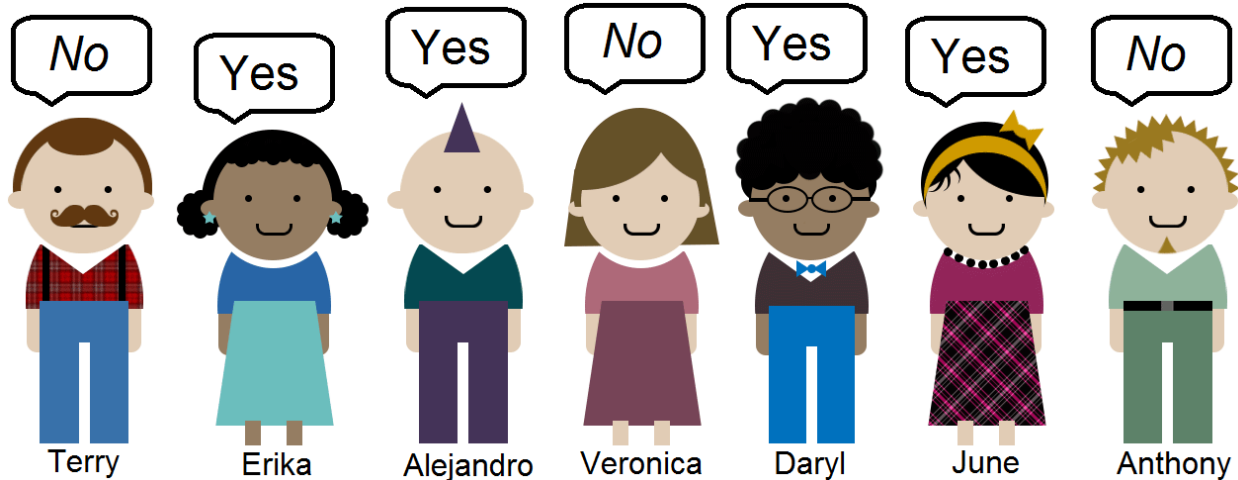
Friday, May 1: Francisco

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

1. Francisco is interested in how the people who live in his neighborhood feel about the construction of a new bar right next to a playground. He walks through the playground and asks the following question to the **3** people who are at the playground.

Do you think it would be a good idea for there to be a noisy bar on the corner even though it is right next to the very busy playground?

The population that Francisco's interested in are the **7** people who live in his neighborhood. Here are those 7 people and how they would answer this question.



a) How big is the population?

b) How big is the sample?

c) The **parameter** is the percentage of the population that agrees with the survey. What is the parameter?

$p =$

d) If Terry, Veronica, and Anthony were the 3 people in the park, what would Francisco conclude from his survey? **Explain your reasoning.**

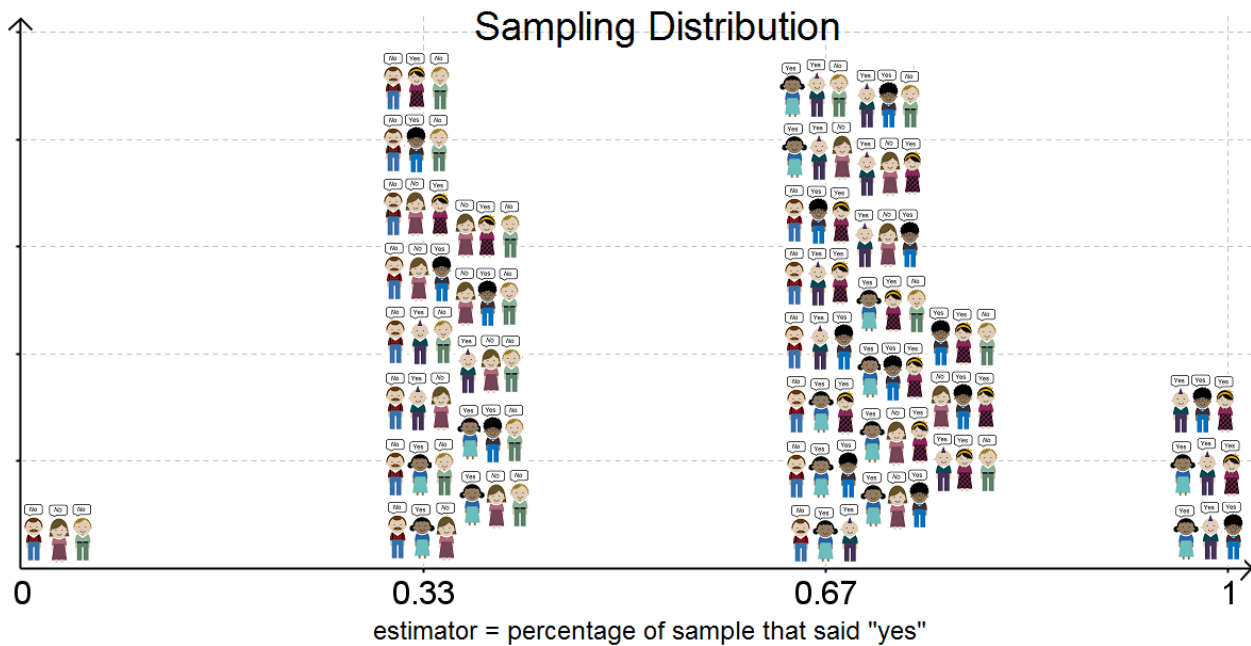
e) The **estimator** is the percentage of the sample that agrees with the survey. If Terry, Veronica, and Anthony were the 3 people in the park, what would the estimator be?

$$\hat{p} =$$

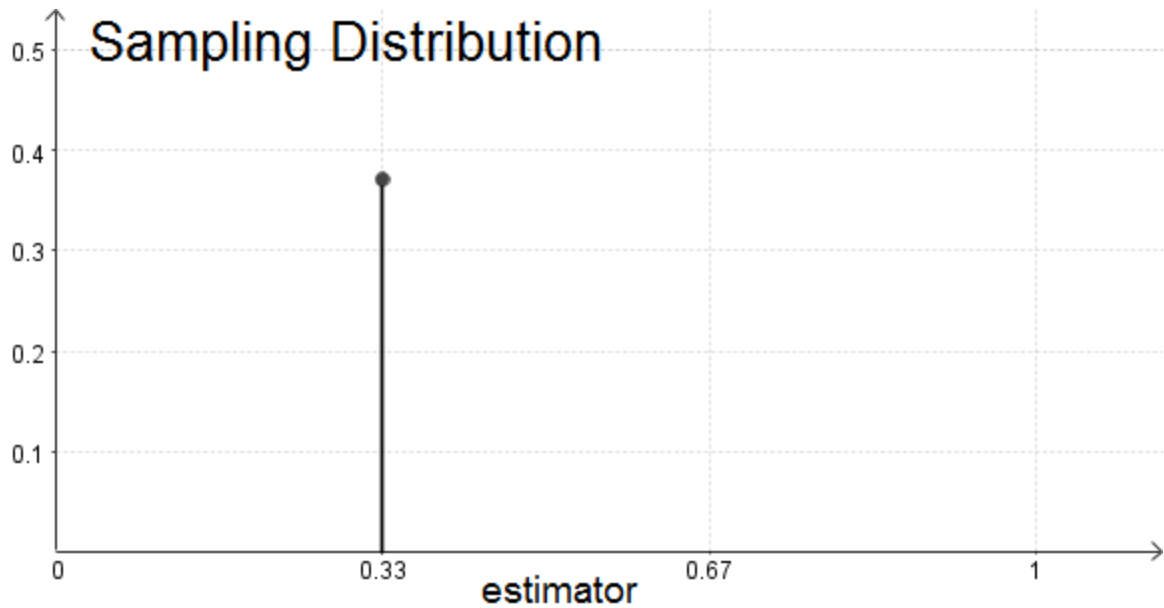
f) If Terry, Erika, and Alejandro were the 3 people in the park, what would the estimator be? What would Francisco conclude from his survey? **Explain your reasoning.**

$$\hat{p} =$$

2. The **sampling distribution** tells you all possible samples that Francisco *could* select and the estimator for each of these samples. He will only select one sample. The picture below shows the sampling distribution.



- a) Use the picture above to create a graph of the sampling distribution. I've started this graph for you.



- b) What is the probability that if Francisco talked to a random sample of people, 33% of them would say they favor the bar?
- c) What is the probability that if Francisco talked to a random sample of people, none of them would say they favor the bar?
- d) Would you say that this distribution is unimodal? Symmetric? Is this a normal distribution? **Explain your reasoning.**

3. The Central Limit Theorem says that if Francisco had picked a bigger sample, and he had done so in a more random manner, then the sampling distribution would be normal.

- a) What if there were 1000 people in Francisco's neighborhood and 43% of them favor the bar. If Francisco randomly selected 150 of them? Could he use the Central Limit Theorem in that case?

Explain your reasoning.

- b) According to the Central Limit Theorem, what would be the mean and standard error?

- c) What would be the probability that 20% or fewer of the respondents would favor the bar?

- d) What would be the probability that between 35% and 51% of the respondents in the sample would favor the bar?

e) Use the table below to find the 90% confidence interval.

Confidence Level	Margin of Error is...
99%	2.58 standard errors
95%	1.96 standard errors
90%	1.645 standard errors
80%	1.28 standard errors

f) Use the table above to find the 80% confidence interval.

g) **Explain** in your own words what these confidence intervals mean.