

Graphs of the Theory

In *The Theory of Three-Person Polls*, you examined what happens if a three-person poll is taken from a population that is 60% in favor of a given candidate. In Questions 1 and 2 of this activity, you'll consider what happens as the true proportion changes. Question 3 asks you to think about the effect of changing the sample size. Continue to use a “sampling with replacement” model to find the probabilities.

1. Suppose the true proportion, which we usually call p , is .55. That is, suppose 55% of the overall population is in favor of a given candidate. The fraction of votes in favor of the candidate in a specific poll is called the **sample proportion**. We often use the symbol \hat{p} for the sample proportion. (This symbol is read as “ p hat.”) Make a probability bar graph showing the probability of getting each possible value of \hat{p} for a three-person poll.
2. Now make a probability bar graph for the case in which the true proportion is 70%. Compare this graph with the graph from Question 1.
3. Generalize your work from Questions 1 and 2. That is, assume the true proportion is p , and find the probability for each possible sample proportion for a three-person poll.

Your probabilities will be expressions in terms of p . You do not need to make a probability bar graph for this general case.

4. In Question 1, you made a probability bar graph for a three-person poll using a true proportion of 55%. How do you think the graph would change if the sample size were increased (keeping the same true proportion of 55% for the overall population)?

