## Data and Chance notes <br> Chapter 22

Below are terms from the readings. Write definitions and examples in the spaces provided. Answer the questions where indicated.

## Chapter 22: Hypothesis testing

What is a sampling distribution?

Let's suppose we have a population where $25 \%$ of the entire population believe in extraterrestrials. We will sample 1000 people to investigate this population. What is the mean and standard deviation of the sampling distribution? Round your standard deviation to three decimal places.

For the above distribution, draw a normal curve with the mean and plus or minus one, two, and three standard deviations marked.

How likely are we to draw a sample from this population that has a $\hat{p}$ value of $28.5 \%$ or more? (Use the normal curve.) Draw the appropriate normal curve with area shaded.

Suppose I want to test whether the true population percentage of believers is $25 \%$. I draw a sample of 1000 people and find that $28.5 \%$ of them are believers. Use this information in the following exercises.

Perform a one-sided test at the $1 \%$ level to see if the true population percentage of believers is $25 \%$. Write down your null and alternative hypotheses as well as your final conclusion. Draw the appropriate normal curve with area shaded.

Perform a one-sided test at the $5 \%$ level to see if the true population percentage of believers is $25 \%$. Write down your null and alternative hypotheses as well as your final conclusion.

Perform a two-sided test at the $1 \%$ level to see if the true population percentage of believers is $25 \%$. Write down your null and alternative hypotheses as well as your final conclusion. Draw the appropriate normal curve with area shaded.

Perform a two-sided test at the $5 \%$ level to see if the true population percentage of believers is $25 \%$. Write down your null and alternative hypotheses as well as your final conclusion.

How does changing the confidence level change your conclusion?

How does changing the test from a one-sided to a two-sided test change your conclusion?

