

Name: \_\_\_\_\_ Hour: \_\_\_\_\_ Date: \_\_\_\_\_

### Learning Targets

- State and check the Random, 10%, and Large Counts conditions for performing a significance test about a population proportion.
- Calculate the standardized test statistic and P-value for a test about a population proportion.

## Lesson 9.2: Day 1: Are you sure Mrs. Cowells isn't a good free throw shooter?

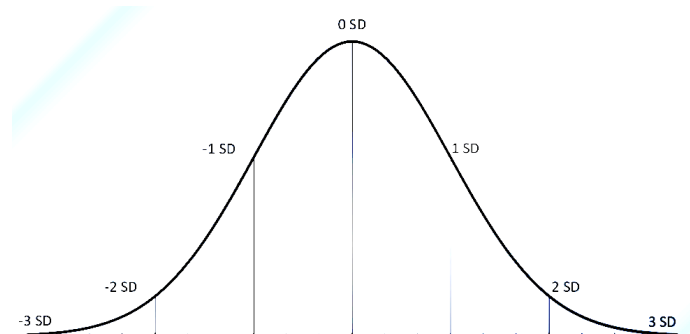


VS



In Lesson 9.1 we used simulation to estimate a P-value to decide whether or not Mrs. Cowells was exaggerating about her free throw percentage. Today, we will use a formula to find a P-value.

1. We're going to carry out the significance test from lesson 9.1 again. Begin by writing the hypotheses.
2. a. Each class found a different P-value because each dotplot was different. Would it be appropriate to use a Normal distribution to model the sampling distribution of  $\hat{p}$ ? Justify your answer.  
  
b. Are there any other conditions we should check?
3. Now that conditions have been met, find the mean and standard deviation of the sampling distribution of  $\hat{p}$ .
4. Use the mean and standard deviation you found to label the Normal curve.
5. How many standard deviations below the mean (z-score) is  $\hat{p} = 0.64$ ? Label it on the normal curve.
6. Find the probability of an 80% shooter making 32/50 ( $\hat{p} = 0.64$ ) or less.



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7. What conclusion can we make?

## Lesson 9.2 Day 1– Significance Test for $p$

### Important ideas:

#### L.T. #1 Significance tests for population proportions Conditions must be met:

1. Random: Data should come from a well-designed \_\_\_\_\_  
\_\_\_\_\_ or \_\_\_\_\_.  
Otherwise we can't infer to the population or establish cause and effect.
2. Independent: sampling with replacement for the population allows us to use standard deviation formulas, or if sampling without replacement, we meet the 10% condition for independence
3. Normal: sampling distribution of the statistic is \_\_\_\_\_

\*\* For Hypothesis Tests, we start by assuming the Null  $H_0$  is True, so we will use \_\_\_\_\_  
\*\*\*

FOR LARGE COUNTS CONDITION (NORMAL CONDITION)

#### L.T. #2 Calculations: Test Statistic & P-Value

Test Statistic: Measures \_\_\_\_\_  
Is from the \_\_\_\_\_ and in what direction \_\_\_\_\_  
on a \_\_\_\_\_

We use the Test Statistic to find the \_\_\_\_\_

Test Statistic (z- score) =

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## Check Your Understanding

According to the U.S. Census Bureau, the proportion of students in high school who have a part-time job is 0.25. An administrator at a local high school suspects that the proportion of students at her school who have a part-time job is less than the national figure. She would like to carry out a test at the  $\alpha = 0.05$  significance level. The administrator selects a random sample of 200 students from the school and finds that 39 of them have a part-time job.

- (a) State appropriate hypotheses for performing a significance test. Be sure to define the parameter of interest.
  
  
  
  
  
  
  
  
  
  
- (b) Explain why the sample result gives some evidence for the alternative hypothesis.
  
  
  
  
  
  
  
  
  
  
- (c) Check if the conditions for performing the significance test are met.
  
  
  
  
  
  
  
  
  
  
- (d) Calculate the standardized test statistic and P-value.
  
  
  
  
  
  
  
  
  
  
- (e) What conclusion would you make?