# Chapter 7: Hypothesis Testing

Hypothesis: a claim or statement about a property of a population

Hypothesis Test (Test of Significance): standard procedure for testing a claim about a property of a population

# 7-2 Basics of Hypothesis Testing

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# NULL HYPOTHESIS ($H_0$)

a statement that the value of a population proportion such as p, is equal to some claimed value. Here are some typical null hypotheses:

means proportions

$H_0$: $\mu = 26.6$ or $H_0$: $p = .33$

To test a null hyp, assume it is true and then reach a conclusion to reject $H_0$ or fail to reject it.

## ALTERNATIVE HYPOTHESIS ($H_1$ OR $H_a$)

a statement that the parameter has a value that differs from the null hypothesis.

Ex. $H_1: p < .05$

$H_{1:}\ \mu > 24.3$

$H_1: \mu \neq 17.2$

$>$

$<$

$\neq$

When forming a hypothesis, you must use an alternative hypothesis–in other words, your claim must be expressed using $>$, $<$, or $\neq$.

Ex. Ford claims that if it has developed a new technology that will raise the mpg of its cars so that the mean becomes greater than 35.

Ho: $\mu = 35$

Ha: $\mu > 35$

Write the null and alt hyp in symbolic form for each claim.

1) The proportion of students who copy answers is less than .45.

$H_0: p = .45$

$H_a: p < .45$

2) The mean age of Fun College is 19.6 years.

$H_0: \mu = 19.6$

$H_a: \mu \neq 19.6$

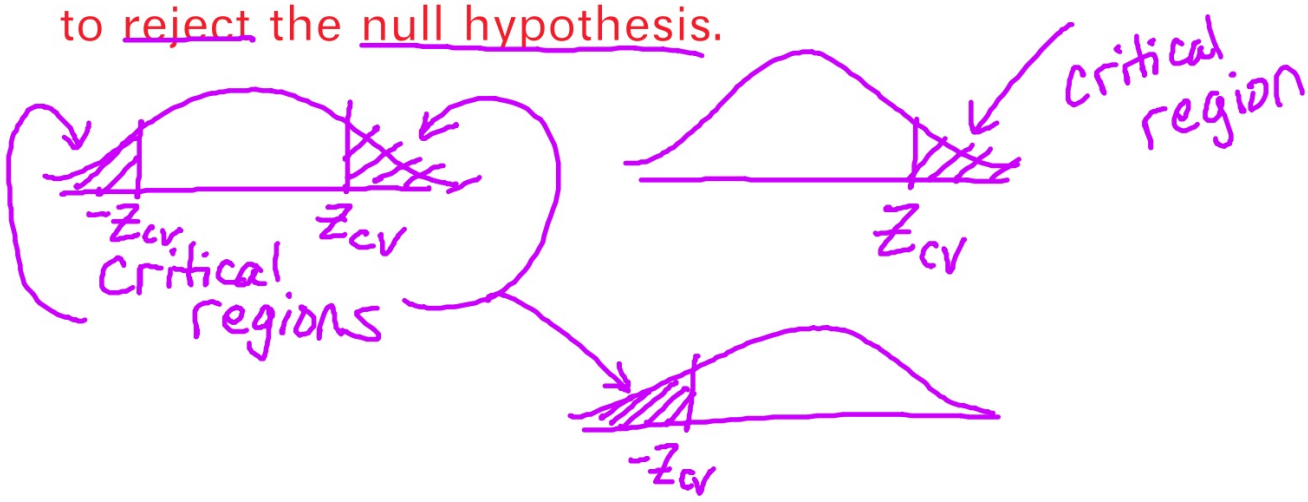
3) The percentage of students who drive to school is not equal to 48%.

$H_0 : p = .48$

$H_a : p \neq .48$

## Critical Region, Significance Level, Critical Value,

The critical region (rejection region) is the set of all values of the test statistic that cause us to reject the null hypothesis.

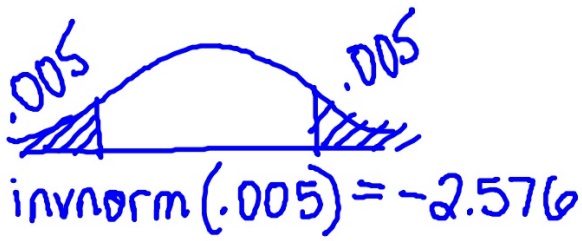


Find the critical z values. Assume that a normal distribution applies in each case.

1) Two-tailed test: $\alpha = .01$

$\frac{.01}{2}$

$Z_{cv} = \pm 2.576$




2) Right-tailed test: $\alpha = .05$

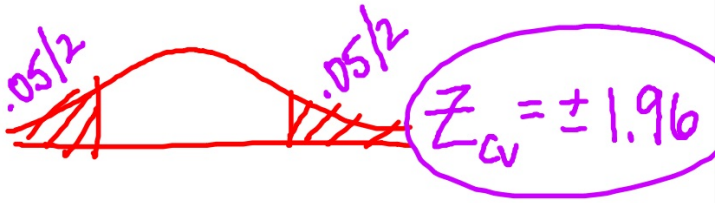
$Z_{cv} = 1.645$


3) Left-tailed test: $\alpha = .10$

$Z_{cv} = -1.28$

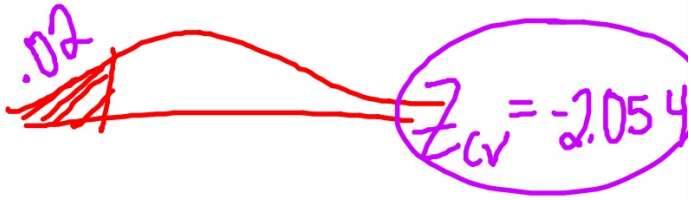
4) $\alpha = .05$, $H_1$ is $p \neq .25$

2-tail




5) $\alpha = .02$, $H_1$ is $p < .35$

left tail




6) $\alpha = .01$ $H_1$ is $p > .24$

right tail