P-value (Probability Value)

A p-value is the probability value. It is the probability of the event occuring simply by chance.

Round the p-value to 3 significant digits (It's a probability)

P-values will NEVER be negative!

P-values will NEVER be larger than 1!

$0 \leq \text{pvalue} \leq 1$

The P-value can help you determine whether to reject or fail to reject the null.

We will reject if the p-value is less than alpha α

This is the same thing as rejecting null if the z-score is in the critical region.

Traditional

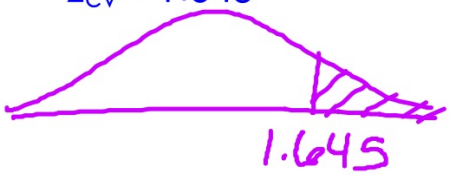
reject if z is in the critical region

Pvalue

reject if pvalue $< \alpha$

Traditional Method
(one-tail) right-tail
alpha = 0.05

Z_{cv} = 1.645



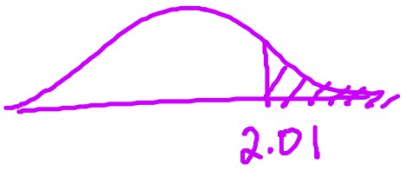
z = 2.01

reject; Z is in the critical region

P-value Method
(one-tail) right tail
alpha = 0.05

pvalue < .05

reject if pvalue < alpha



z = 2.01

ncdf(2.01, 88888) = .0222

We are still rejecting the null for the same reason; the data indicates the probability is small enough to reject the null.

reject

1. Left Tail; alpha = 0.02, z = -2.41

-2.41

ncdf(-8888, -2.41) = .00798

Reject if pvalue < .02

reject H_0 b/c

.00798 < .02

2. right tail; alpha = 0.01, z = 1.89

1.89

ncdf(1.89, 8888) = .0294

reject if pvalue < .01

do not reject H_0

.0294 > .01

3. two tail; alpha = 0.05; z = -2.44

reject if pvalue < .05

reject;
.0147 < .05

-2.44 ncdf(-8888, -2.44) x2 = .0147

4. two tail; alpha = 0.10; z = 1.41

reject if pvalue < .10

1.41

do not reject
.159 > .10

ncdf(1.41, 88888) x2 = .159

Find the p-value.

$\alpha = .005$

Null: The administration is telling the truth
Alternative: The administration is lying

reject H_0 if pvalue $< .005$

$_{30}C_5$

$$P(\text{select 5 top students randomly}) = \frac{1}{{}_{30}C_5} = 7.02 \times 10^{-6}$$

$= .0000007 02$

Strongly reject H_0

$.00000702 < .005$