P-Value

① More than 30% of class of 2025 at Bryant major in Fiorca.

H_0: $p \leq .3$ (less than or equal to 30%)

H_1: $p > .3$ (more than 30%)

② collect data: There are 2 ways to present the data

①

ID	Major in Fiorca
1	Yes
2	Yes
3	No
4	Yes
5	No
⋮	⋮
35	Yes

②

Number of Students: 35

Fiorca majors: 8

③ p-value is the probability that the data exists if H_0 is true

If p-value is 0

⇒ If H_0 is true, the probability the data exists is 0.

or there is NO chance you see the data.

But the data DOES exist. You do see the data.

This means H_0 is Not True

$\Rightarrow$ The opposite of H_0 is True.

$\Rightarrow$ H_1 is True

The argument: ① p-value = 0: If H_0 is true, the impossible happens

$\Rightarrow$ H_0 should not be True

$\Rightarrow$ H_1 is True

② p-value is extremely small ($p \leq .05$)

If H_0 is true, then almost certain that you will the different data

$\Rightarrow$ H_0 should not be true

$\Rightarrow$ H_1 should be true OR The data supports H_1

③ p-value is not small ($p > .05$)

If H_0 is true, there is a good chance the data exists.

H_0 may be true or not.

$\Rightarrow$ H_1 may be true or not.

$\Rightarrow$ we found no evidence to support H_1 or the data does not support your hypothesis, H_1

Small p-value ($p < .05$)

(1) There is evidence to support H_1 (H_1 is the hypothesis you want to test)

(2) The data support H_1

(3) Reject H_0

Non-small p-value ($p > .05$)

significant level

The data does not support H_1

Fail to reject H_0

we reach No conclusion when p-value is not small ($> .05$)