	SC	OC
Examples: Less than **13%** of drivers text while driving.	**P < 0.13**	**P ≥ 0.13**
At least **55%** of college students have Facebook account.	**P ≥ 0.55**	**P < 0.55**
At most **21%** of tablets in the market are made by Samsung	**P ≤ 0.21**	**P > 0.21**

Test Statistics:　$Z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{p(1-p)}{n}}}$　　　　To test population proportion (**P**)

Proportion

Problem 1.

At $\alpha = .05$ test that **85%** of stat students pass the course. Out of 200 students only 156 students passed the course.

SC: **P** = .85　　　　H_0 : **P** = .85　　Hint: Use H_1 to determine if it is LTT ,TTT or RTT test
OC: **P** ≠ .85　　　　H_1 : **P** ≠ .85　　Note: P in H_1 **is not equal,** then it is a **TTT**

When $\alpha = .05$, n > 30 and two –tailed test then by using bottom row of page **Table 2.**

Critical value = CV = **Z** = $\pm$ **1.96**

$R \quad \quad A \quad \quad R$

$-1.96 \quad 0 \quad 1.96$

Sample proportion = $\hat{p} = \dfrac{156}{200} = .78$
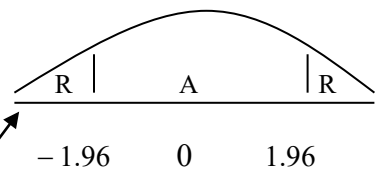
Test Statistics $= z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{p(1-p)}{n}}} = z = \dfrac{.78 - .85}{\sqrt{\dfrac{.85(1-.85)}{200}}} = \dfrac{-.07}{0.02525} = -2.77$ *Falls inside CR*

Conclusion: Accept or reject H_0? Inside *CR* then reject **Ho**

Comment: Accept or reject **SC**? Reject that **85%** of stat students pass the course.

P-value: 0 .005564 less than $\alpha = 0.05$ reject **Ho**

TI-83/84 *stat* → *test* → *Option 5*

Step 1
```
EDIT CALC TESTS
1:Z-Test…
2:T-Test…
3:2-SampZTest…
4:2-SampTTest…
5█1-PropZTest…
6:2-PropZTest…
7↓ZInterval…
```

Step 2
```
1-PropZTest
P0:.85
x:156
n:200
prop█P0 <P0 >P0
Calculate Draw
```

Step 3
```
1-PropZTest
prop≠.85
z=-2.77241312
P=.0055643525
p̂=.78
n=200
```
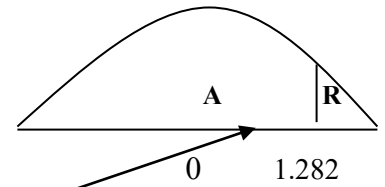
Problem 2. At $\alpha = .10$ test that **more than 85%** of stat students pass the course. Out of 200 students only 172 students passed the course.

SC: $\mathbf{P} > 0.85$ $\mathbf{H_0} : \mathbf{P} \leq 0.85$ **Hint**: Use $\mathbf{H_1}$ to determine if it is LTT ,TTT or RTT test

OC: $\mathbf{P} \leq 0.85$ $\mathbf{H_1} : \mathbf{P} > 0.85$ **Note**: P **in H$_1$ is more than,** then it is a **RTT**

When $\alpha = .10$, n > 30 and one –tailed test then by using bottom row of page **Table 2.**

Critical value = CV = **Z = 1.282**

Sample proportion = $\hat{p} = 172 / 200 = .86$

Test Statistics $= z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{p(1-p)}{n}}} = z = \dfrac{.86 - .85}{\sqrt{\dfrac{.85(1-.85)}{200}}} = \dfrac{0.01}{0.02525} = 0.3960$ **Fall outside *CR***

Conclusion: Accept or reject H$_0$? Outside CR then **Fail to Reject H$_0$** or **Accept H$_0$**

Comment: Accept or reject **SC**? Reject that **more than 85%** of stat students pass the course.

P-value: 0 .3960 > $\alpha = 0.10$ accept **Ho**

TI-83/84 *stat* → *test* → *Option 5*

```
EDIT CALC TESTS      1-PropZTest        1-PropZTest
1:Z-Test…            P0:.85             Prop>.85
2:T-Test…            x:172              z=.3960590172
3:2-SampZTest…       n:200              P=.3460307916
4:2-SampTTest…       Prop≠P0  <P0       p̂=.86
5:1-PropZTest…       Calculate Draw     n=200
6:2-PropZTest…
7↓ZInterval…
```

Problem 3. Prior to election day, an opinion poll among registered voters indicate that 433 voters will vote for incumbent President and 367 will not., Can it be claimed at $\alpha = 0.01$ that incumbent President will win the majoarity of the votes(getting above 50% of the vote)?

SC: $\mathbf{P} > 0.50$ $\mathbf{H_0} : \mathbf{P} \leq 0.50$ **Hint**: Use $\mathbf{H_1}$ to determine if it is LTT ,TTT or RTT test   CV = **Z = 2.32**

OC: $\mathbf{P} \leq 0.50$ $\mathbf{H_1} : \mathbf{P} > 0.50$ **Note**: P **in H$_1$ is more than,** then it is a **RTT**

When $\alpha = 0.01$, n > 30 and one –tailed test then by using bottom row of **Table 2.**
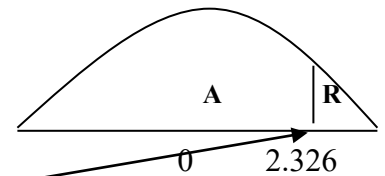
Sample proportion = $\hat{p} = 433 / 800 = .54125$

Test Statistics $= z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{p(1-p)}{n}}} = z = \dfrac{.54125 - .50}{\sqrt{\dfrac{.50(1-.50)}{800}}} = 2.33$ *Very close to CR*

Conclusion: Accept or reject H$_0$? **Test Statistics is too close to Critical value,** so decision is **inconclusive**

Comment: Accept or reject **SC**? **Inconclusive** as who the winner will be.

P-value: 0 .098 almost the same as $\alpha = 0.001$ **Inconclusive**.

```
EDIT CALC TESTS      1-PropZTest        1-PropZTest
1:Z-Test…            P0:.5              Prop>.5
2:T-Test…            x:433              z=2.333452378
3:2-SampZTest…       n:800              P=.0098121857
4:2-SampTTest…       Prop≠P0  <P0  >P0  p̂=.54125
5:1-PropZTest…              Draw        n=800
6:2-PropZTest…
7↓ZInterval…
```