Hypothesis Testing *involving a population proportion*

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A medium sized university in the US introduces a new lunch facility on campus on a trial basis. The university operates the Lunch facility for a few months and then decides to survey the student body. Based on the survey, university would make this facility a permanent fixture or do away with it. Specifically, if more than or equal to 70% of the student body approves of it then the facility would be made permanent else it would shut down.

The university conducts a survey with 750 randomly selected students on campus and finds that 510 of these students (or 68% of the sampled students) approve of the new facility and the remaining 240 students or 32% students do not approve of it.

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- The facility would be made permanent if ≥ **70%** of entire student body approves of it.
- The University has a sample of **750 responses**.

Hypothesis Testing *involving a population proportion*

Step 1 **: Formulate Hypothesis**

H_0: $p \geq 0.70$

H_A: $p < 0.70$

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$$\text{z-statistic} = \frac{\bar{p} - p}{\sqrt{\frac{p(1-p)}{n}}} = -1.1952$$

The following conditions should be met…

$$n\bar{p} > 5 \quad \textit{and} \quad n(1-\bar{p}) > 5$$

Hypothesis Testing *involving a population proportion*

***Step 3* : Cutoff values for the z-statistic**

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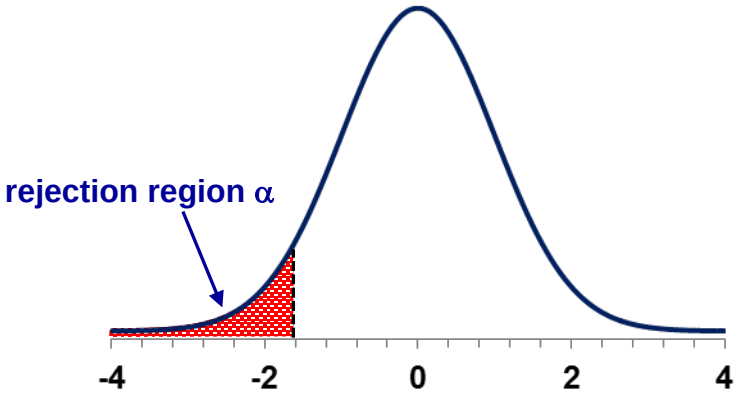
[single tail test, rejection region on the L.H.S.]



Hypothesis Testing *involving a population proportion*

Step 3 **: Cutoff values for the z-statistic** $\alpha = 0.05$

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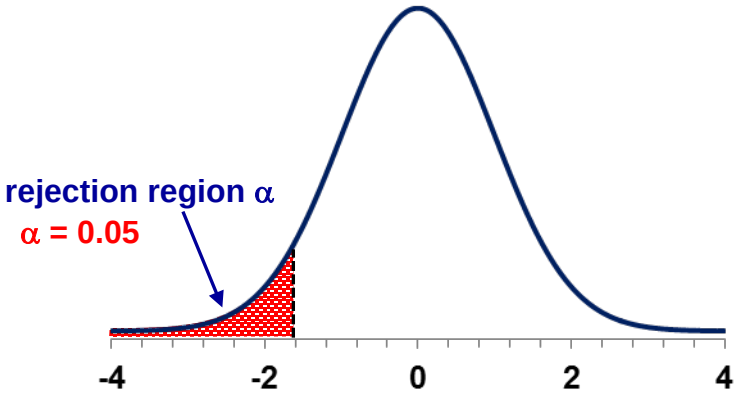

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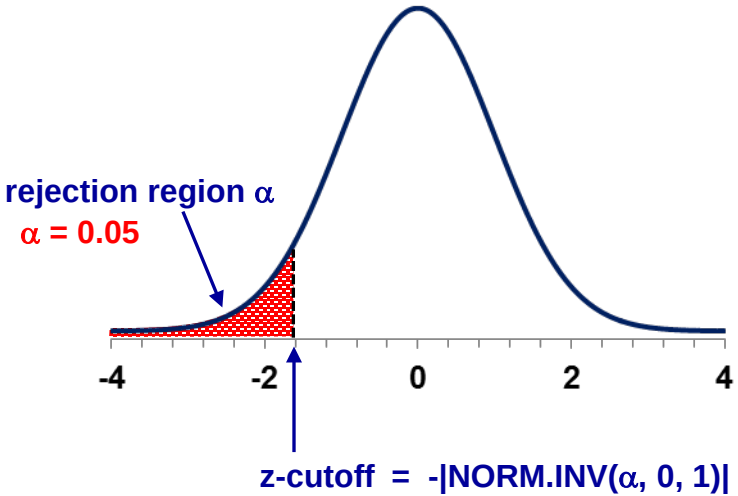

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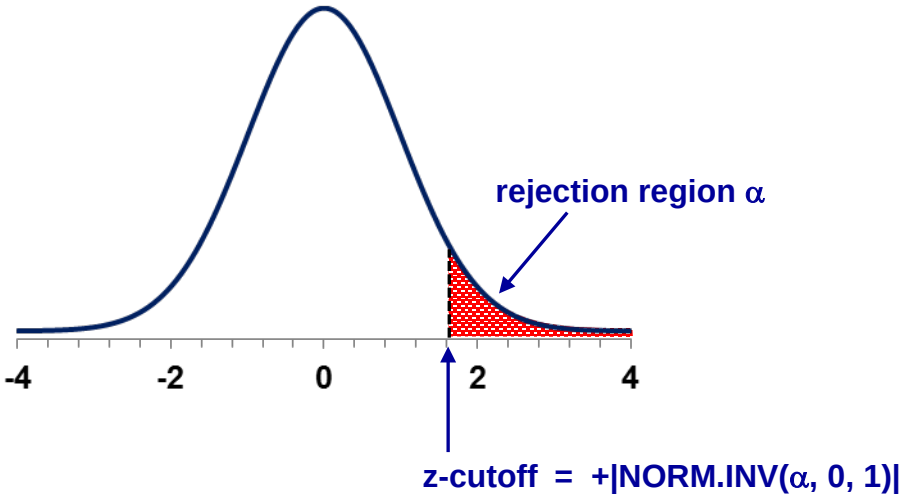

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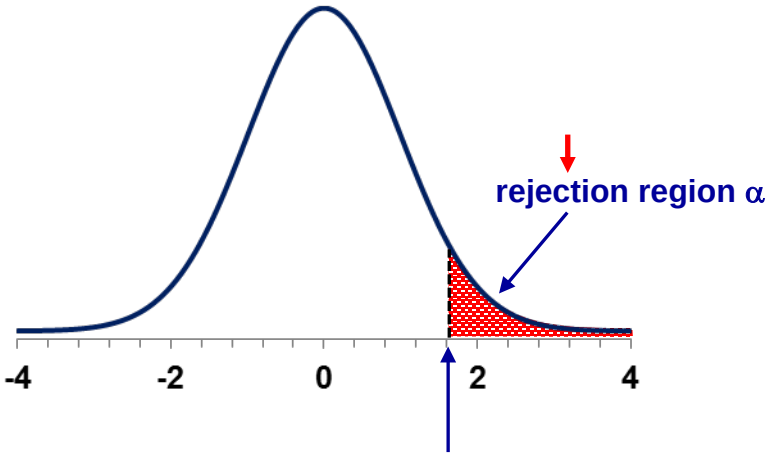

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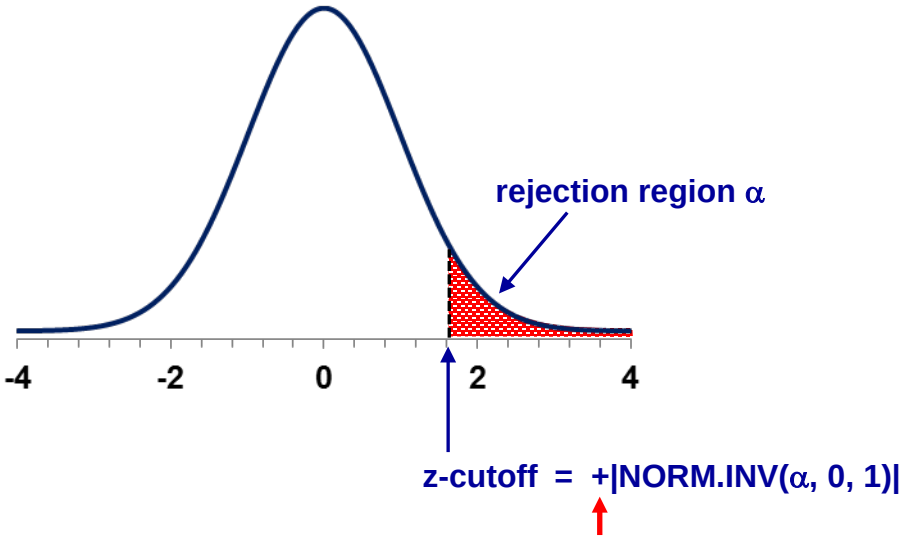

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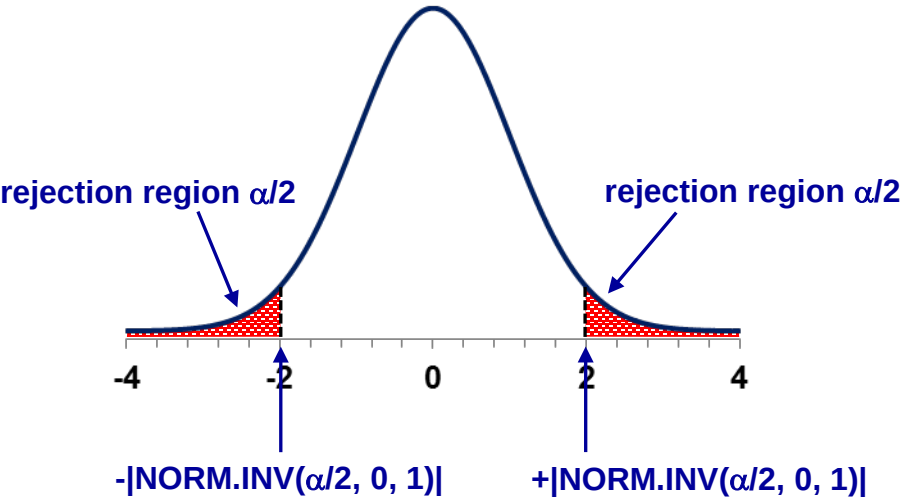

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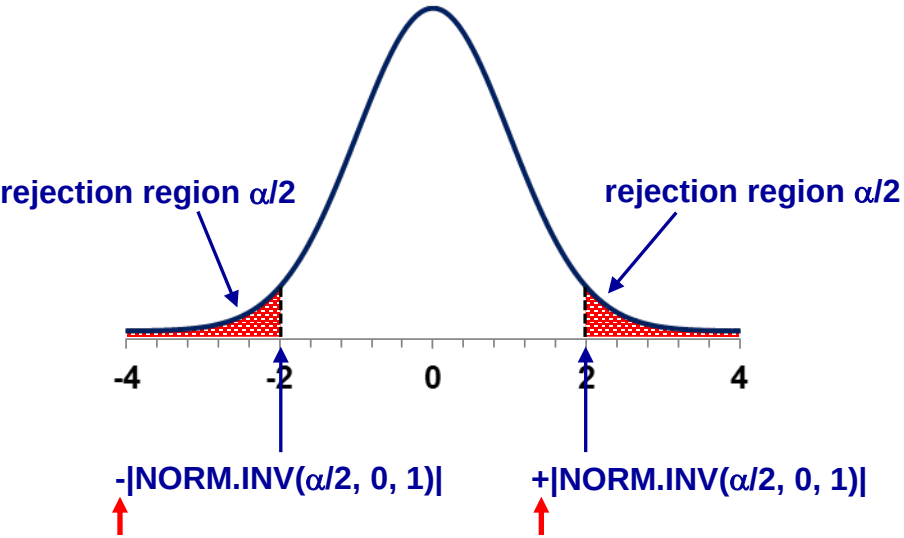

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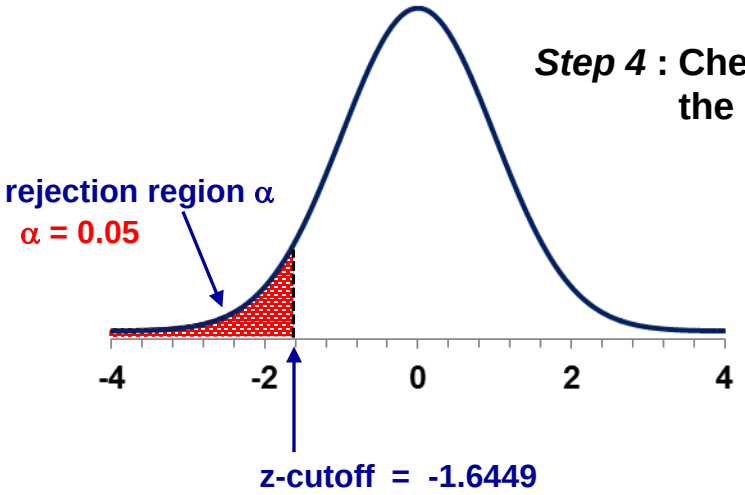

Step 4 **: Check whether z-statistic falls in the rejection region**

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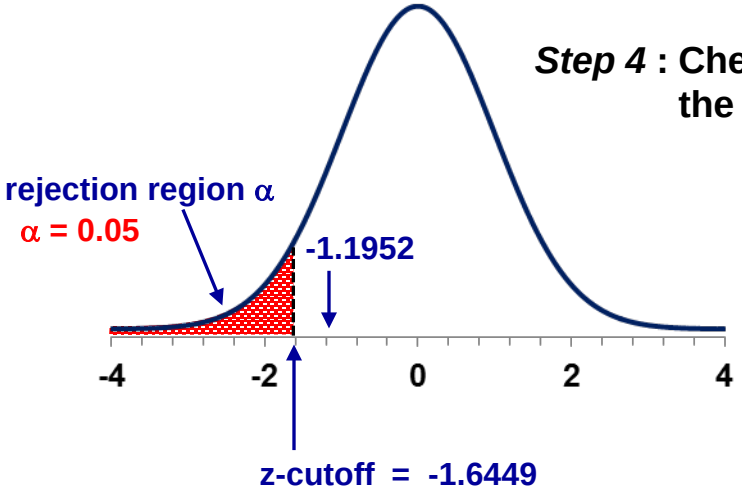

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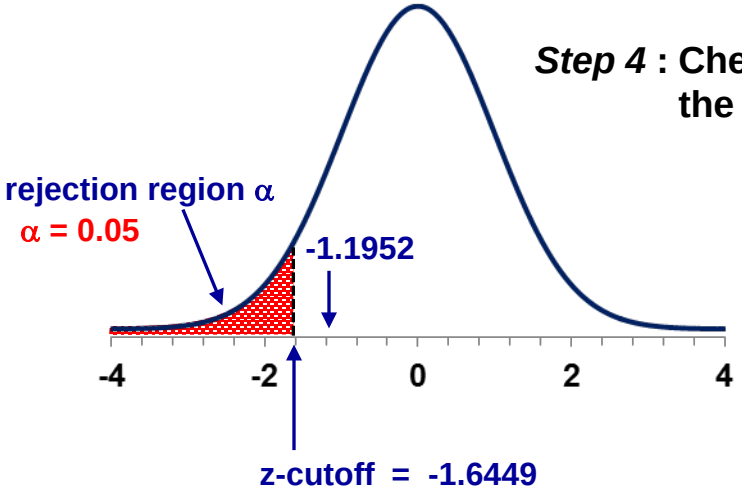

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- **Do not reject Null hypothesis**

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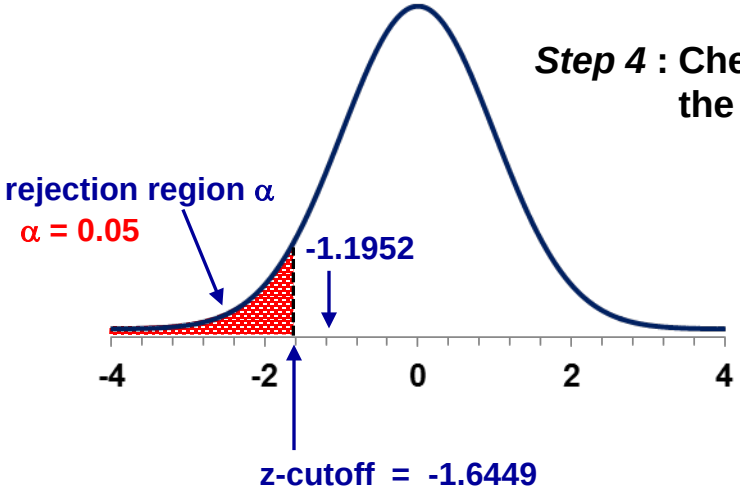

Step 4 **: Check whether z-statistic falls in the rejection region**

- **Do not reject Null hypothesis**
- **The lunch facility should be made permanent**