

Hypothesis Testing



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 - *Name*
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- The file *Athletes.xlsx* contains data on a sample of Olympic athletes from some past Olympic games.
 - *Name*
 - *Height*
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 - *Country*
 - *Gender*

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- ❑ *Use sample data in Athletes.xlsx file to solve for this hypothesis test*



Hypothesis Testing *Difference in means test*

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Null Hypothesis $H_0: \mu_{\text{height}} > 173$



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Null Hypothesis $H_0: \mu_{\text{height}} > 173$
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A large red 'X' is drawn over the original hypotheses. A grey curved arrow points from the 'X' towards the corrected hypotheses below.

Null Hypothesis $H_0: \mu_{\text{height}} \leq 173$
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One tailed test with rejection region on the R.H.S.

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mouth opens on the R.H.S. Thus rejection region on R.H.S.

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A single population
mean in H_0 and H_A

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Step 2 : Calculate the t-statistic



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$$\text{t-cutoff} = +|T.INV(\alpha, n-1)| \quad \alpha = 0.05$$

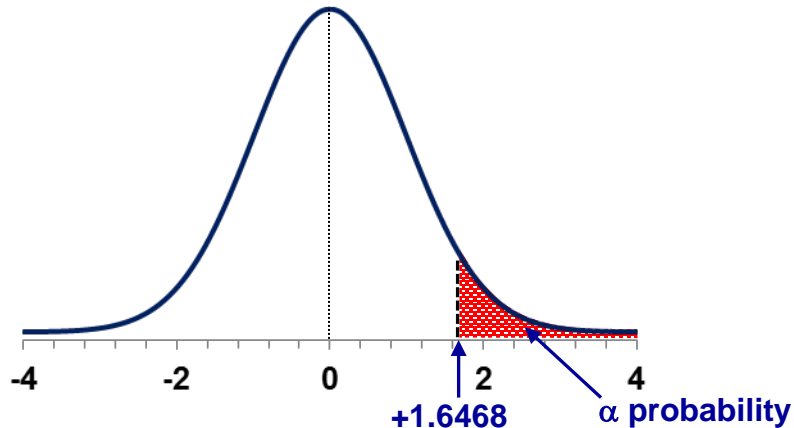
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[single tail test, rejection region on the R.H.S.]



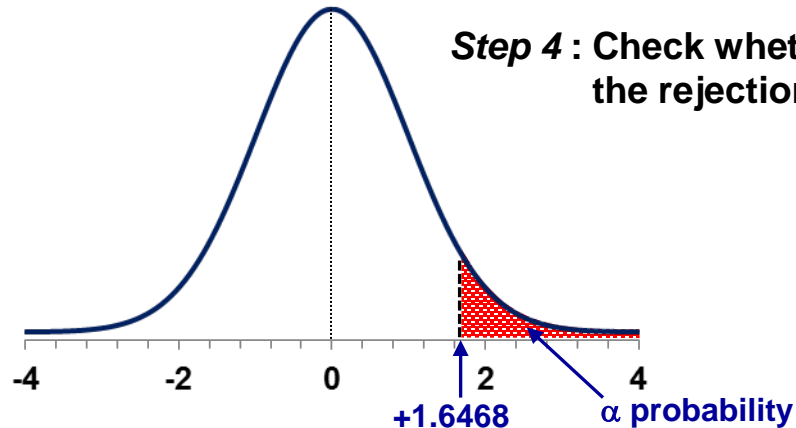
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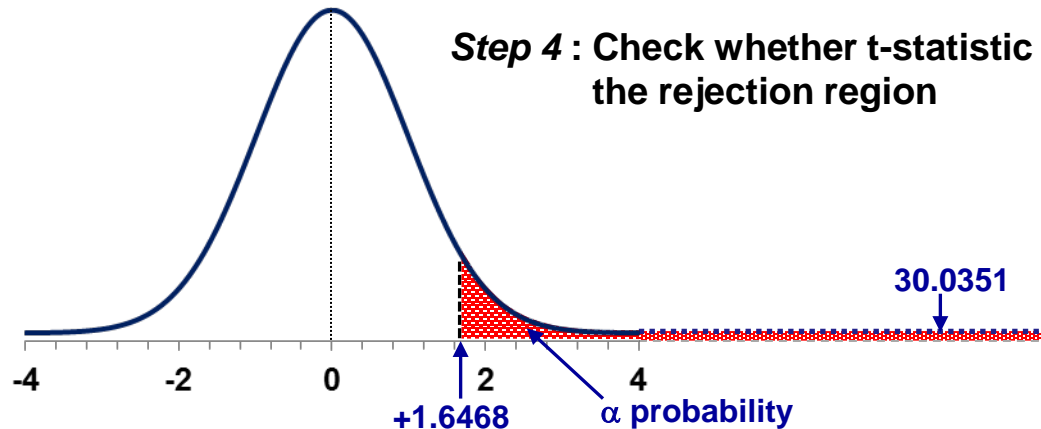
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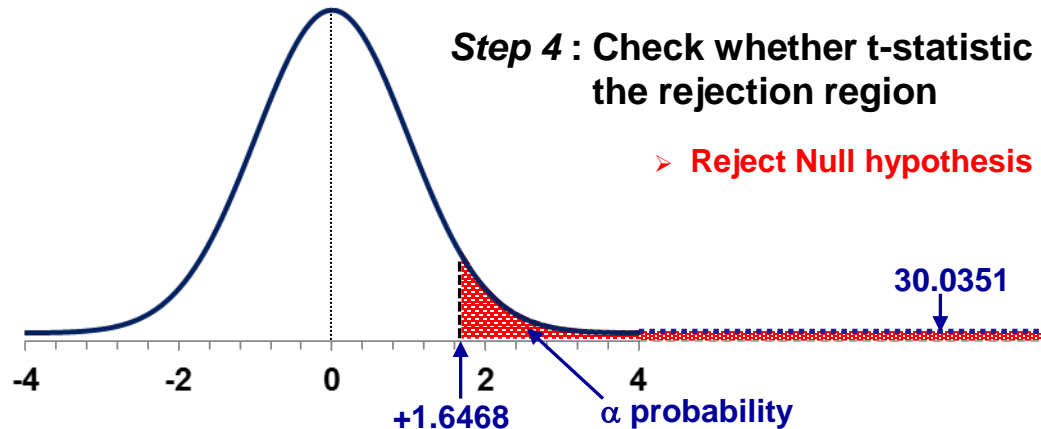
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What does Rejecting the Null Hypothesis imply?

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$$H_0: \mu_{\text{height}} \leq 173 \text{ Reject}$$

- Reject Null hypothesis that the population mean height of men athletes at the Olympics is 173 cm or less

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What does Rejecting the Null Hypothesis imply?

$H_0: \mu_{\text{height}} \leq 173$ **Reject**

$H_A: \mu_{\text{height}} > 173$ **Do not reject**

- **Reject Null hypothesis that the population mean height of men athletes at the Olympics is 173 cm or less**
- **Do not reject the *Alternate hypothesis* that the population mean height of such athletes is greater than 173 cm.**

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- **Thus our final conclusion is that based on our data evidence we cannot reject the claim that male athletes at Olympics are taller than 173 cm.**

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Extending the test to a situation involving two populations

The empirical study referred to earlier claimed average height of men to be 173 cm.

We rejected this claim when applied to men athletes at the Olympics.

The same study also claimed that the ***difference in average heights*** across men and women from various walks of life around the world was 12.5 cm.

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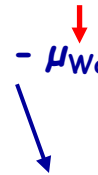
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$$\begin{array}{c} \downarrow \\ \mu_{\text{Men}} - \mu_{\text{Women}} \\ \searrow \end{array}$$

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Hypothesis test for
"Difference in Means"

$$\mu_{\text{Men}} - \mu_{\text{Women}}$$

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