



## Hypothesis Testing *Two types of possible error*

*Type I error*

*Type II error*

## Hypothesis Testing *Two types of possible error*

### Example

Your friend Sam claims that he can shoot 40 or more baskets in an hour from the 3-point line in a Basketball court. So, Sam is making a claim about a population parameter, in this case it is his true shooting ability from the 3-point line in a Basketball court. This can be likened to the population mean  $\mu$ . Thus Sam is claiming that the population mean  $\mu$  of his shooting ability is greater than or equal to 40 baskets in an hour from the 3-point line in a Basketball court.

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Next, you decide to **test this claim**. For that, you take Sam to the Basketball court everyday for 10 days and make him shoot baskets from the 3 point line for an hour every day. You end up with 10 data points which are the number of baskets Sam shot in those 10 days. You can calculate the sample mean and the sample standard deviation from these ten observations.

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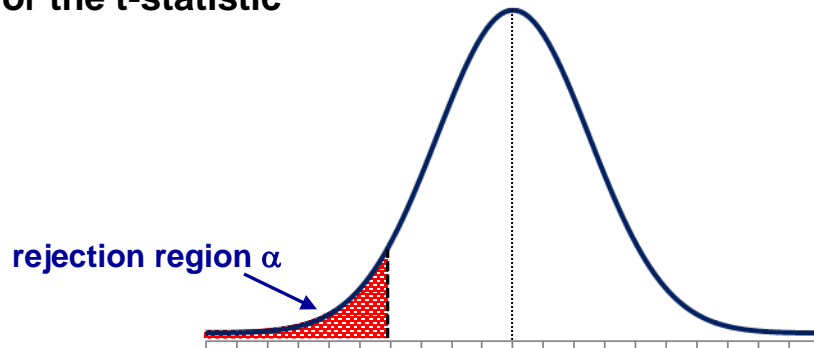
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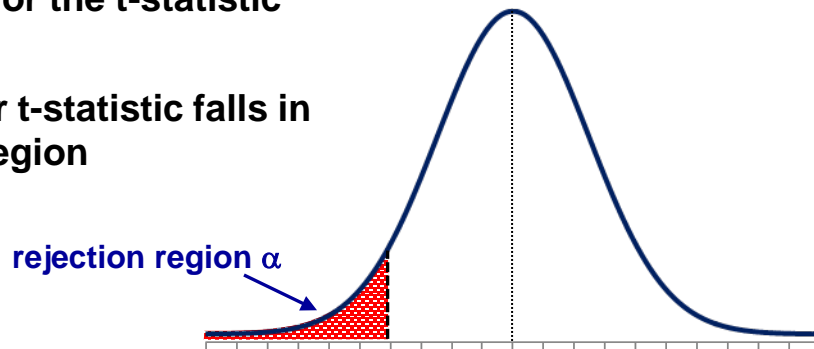
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### Step 4 : Check whether t-statistic falls in the rejection region







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' $\alpha$ ', the significance level is also known as the probability of Type I error.



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You DID NOT reject the Null hypothesis.

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**Type II error:** Not rejecting the Null Hypothesis when it is false

Sam's true ability is NOT  $\geq 40$ .

However the 10 days were lucky for Sam.

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You DID NOT reject the Null hypothesis. **Type II error**



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- Probability of **Type II** error can be reduced by taking a larger sample size.

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