

T TEST TUTORIAL

FOR TWO INDEPENDENT SAMPLES

STATE THE HYPOTHESES & SELECT AN ALPHA LEVEL

$$H_0: \mu_A - \mu_B = 0$$

For the population there is NO difference between the groups.

$$H_1: \mu_A - \mu_B \neq 0$$

For the population there IS a difference between the groups.

IDENTIFY THE CRITICAL REGION. FOR THE INDEPENDENT MEASURES T STATISTIC, DEGREES OF FREEDOM ARE DETERMINED BY:

$$df = n_A + n_B - 2 = \text{ } + \text{ } - 2 = \text{ } = df$$

CONSULT THE T - DISTRIBUTION TABLE FOR A ONE-TAILED TEST WITH:

$$\alpha = .05$$

THE CRITICAL T VALUES ARE: $t = \text{ }$

$$s_p^2 = \frac{SS_A + SS_B}{df} = \frac{\text{ } + \text{ }}{\text{ }} = \text{ } = \text{ }$$

FIND THE POOLED VARIANCE

$$s_{(\bar{X}_A - \bar{X}_B)} = \sqrt{\frac{s_p^2}{n_A} + \frac{s_p^2}{n_B}} = \sqrt{\text{ } + \text{ }} = \sqrt{\text{ } + \text{ }} = \sqrt{\text{ }} = \text{ }$$

FIND THE ESTIMATED STANDARD ERROR

$$t = \frac{(\bar{X}_A - \bar{X}_B) - (\mu_A - \mu_B)}{s_{(\bar{X}_A - \bar{X}_B)}} = \frac{(\text{ } - \text{ }) - (0)}{\text{ }} = \text{ } = \text{ }$$

COMPUTE THE TEST STATISTIC...

MAKE A DECISION ABOUT H_0 USING THE OBTAINED T VALUE...

IF THE ABSOLUTE VALUE OF THE OBTAINED T VALUE IS MORE THAN THE CRITICAL VALUE, REJECT THE NULL HYPOTHESIS AND CONCLUDE THAT THERE IS A SIGNIFICANT EFFECT...

COMPARE THE RED CIRCLE AND THE PURPLE CIRCLE. REMOVE THE NEGATIVE/MINUS SIGN. IF THE # IN THE RED CIRCLE IS BIGGER THAN THE NUMBER IN THE PURPLE CIRCLE, THEN YOUR SAMPLE MEANS ARE SIGNIFICANTLY DIFFERENT AND THERE IS AN EFFECT. IF THE PURPLE CIRCLE IS BIGGER THAN THE RED CIRCLE, THEN THERE IS NO EFFECT!

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SAMPLE A

$$n_A = \underline{\hspace{2cm}}$$

$$\Sigma X = \underline{\hspace{2cm}} \quad \Sigma X^2 = \underline{\hspace{2cm}}$$

$$\bar{X}_A = \frac{\Sigma X}{n}$$

!ROUND TO THE THOUSANDTHS PLACE!

$$\bar{X}_A = \underline{\hspace{2cm}} = \text{[]}$$

FIND THE MEAN FOR EACH SAMPLE

$$SS_A = \Sigma X^2 - \frac{(\Sigma X)^2}{n}$$

$$SS_A = \underline{\hspace{2cm}} - \left(\underline{\hspace{2cm}} \right)^2$$

$$SS_A = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

$$SS_A = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

$$SS_A = \text{[]}$$

FIND THE SUM OF SQUARES (SS)

$$s^2 = \frac{SS_A}{n-1} =$$

$$s^2 = \underline{\hspace{2cm}} = \text{[]}$$

$$s_A = \sqrt{s^2} = \text{[]}$$

FIND THE STANDARD DEVIATION (SD)

SAMPLE B

$$n_B = \underline{\hspace{2cm}}$$

$$\Sigma X = \underline{\hspace{2cm}} \quad \Sigma X^2 = \underline{\hspace{2cm}}$$

$$\bar{X}_B = \frac{\Sigma X}{n}$$

!ROUND TO THE THOUSANDTHS PLACE!

$$\bar{X}_B = \underline{\hspace{2cm}} = \text{[]}$$

FIND THE MEAN FOR EACH SAMPLE

$$SS_B = \Sigma X^2 - \frac{(\Sigma X)^2}{n}$$

$$SS_B = \underline{\hspace{2cm}} - \left(\underline{\hspace{2cm}} \right)^2$$

$$SS_B = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

$$SS_B = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

$$SS_B = \text{[]}$$

FIND THE SUM OF SQUARES (SS)

$$s^2 = \frac{SS_B}{n-1} =$$

$$s^2 = \underline{\hspace{2cm}} = \text{[]}$$

$$s_B = \sqrt{s^2} = \text{[]}$$

FIND THE STANDARD DEVIATION (SD)