

$$H_0 : \mu_S = \mu_J \quad H_a : \mu_S \neq \mu_J$$

where  $\mu_S$  is the mean GPA of sophomores at Novi High School and  $\mu_J$  is the mean GPA of juniors at Novi High School

As two means are being compared and the data is unpaired, a 2-sample  $t$ -test should be performed.

$$\bar{x} = \frac{\sum x_i}{n}$$

$$\bar{x}_S \approx 3.464$$

$$\bar{x}_J \approx 3.56$$

$$s_x = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

$$s_S \approx 0.66$$

$$s_J \approx 0.7$$

$$s_{\bar{x}_S - \bar{x}_J} = \sqrt{\frac{s_S^2}{n} + \frac{s_J^2}{n}} \approx \sqrt{\frac{0.66^2}{30} + \frac{0.7^2}{30}} \approx 1.103$$

$$t = \frac{\bar{x}_S - \bar{x}_J}{s_{\bar{x}_S - \bar{x}_J}} \approx \frac{3.464 - 3.56}{1.103} \approx -0.547$$

$$\text{df} = \frac{s_{\bar{x}_S - \bar{x}_J}^4}{\frac{(s_S/\sqrt{n})^4}{n-1} + \frac{(s_J/\sqrt{n})^4}{n-1}} \approx \frac{1.103^4}{\frac{(0.66/\sqrt{30})^4}{30-1} + \frac{(0.7/\sqrt{30})^4}{30-1}} \approx 29.789$$

$$P\text{-value} = 2\text{tcdf}(\text{lower} : -\infty, \text{upper} : t \approx -0.547, \text{df} : \approx 29.789) \approx 0.931$$

Last full day of school:

Get rid of passcode

Reach my house at 7:45 AM

Give phone

Every class we have together (including lunch), give phone