

Section 9.3

Comparing Pop. Means using Independent Samples (not matched-pair samples).

Claim: Student commute times on average are shorter than faculty commute times at Mt. SAC. μ_1 = mean commute for students (min).

$$\alpha = .05$$

Hypotheses:

$$H_0: \mu_1 = \mu_2, *H_1: \mu_1 < \mu_2$$

μ_2 = mean commute time for faculty (min)

Gather data: $\bar{x}$, s , n for each sample

Students: $\bar{x}_1 = 35.5$ min, $s_1 = 10.6$, $n_1 = 45$

Faculty: $\bar{x}_2 = 46.2$ min, $s_2 = 8.6$, $n_2 = 35$

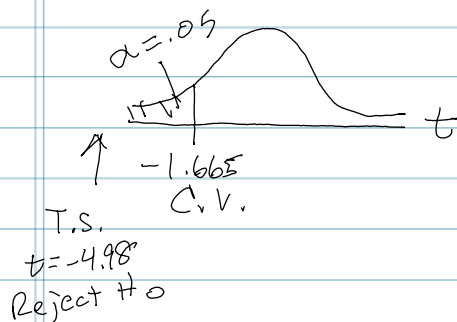
Requirements: each $n > 30$ or the pop's are normal.
 $n_1 = 45 > 30 \checkmark$, $n_2 = 35 > 30 \checkmark$

$$\text{Test Statistic: } t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{(35.5 - 46.2) - 0}{\sqrt{\frac{10.6^2}{45} + \frac{8.6^2}{35}}} = -4.98$$

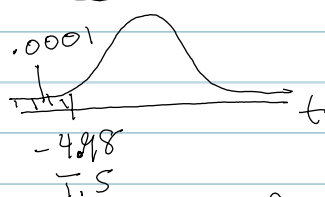
Critical Value (Table A2)

$$df = \frac{(v_1 + v_2)^2}{\frac{v_1^2}{n_1 - 1} + \frac{v_2^2}{n_2 - 1}} = \frac{(2.497 + 2.113)^2}{\frac{2.497^2}{44} + \frac{2.113^2}{34}} = 77.8 = 77 \quad \text{(round down)}$$

$$v_1 = \frac{s_1^2}{n_1} = \frac{10.6^2}{45} = 2.497, \quad v_2 = \frac{s_2^2}{n_2} = \frac{8.6^2}{35} = 2.113$$



P-value (Table A3)



$$p\text{-val} = .0001$$

$$p\text{-val} < \alpha$$

Reject H_0 & Support H_1

Conclusion

The data support the claim that the mean commute time for students is shorter than that for faculty.