

- (c) Suppose we want to test $H_0 : \mu = 5$ versus $H_a : \mu \neq 5$ at the $\alpha = 0.01$ significance level. Based upon your answer in (2b), do you reject H_0 ? Why?
- (d) Based upon your answer in (2a), will a 95% confidence interval for μ contain or exclude 5? Why? Find a 95% confidence interval for μ .
- (e) Suppose we want to test $H_0 : \mu = 7$ versus $H_a : \mu \neq 7$ at the $\alpha = 0.05$ significance level. Based upon your answer in (2d), do you reject H_0 ? Why?
3. (30 pts) A researcher collected data concerning 2 high protein weight loss programs. The amount of weight loss (after 6 months) for subjects on program A follows a normal distribution with mean μ_1 and standard deviation σ_1 , while the amount of weight loss for subjects on program B follows a normal distribution with mean μ_2 and standard deviation σ_2 . For 8 randomly selected subjects placed on program A , the mean weight loss was $\bar{x}_1 = 6.3$ pounds with standard deviation $s_1 = 1.2$ pounds. For 10 randomly selected subjects placed on program B , the mean weight loss was $\bar{x}_2 = 5.2$ pounds with standard deviation $s_2 = 1.0$ pounds. It is known that $\sigma_1 = \sigma_2$.
- (a) Find a 90% confidence interval for $\mu_1 - \mu_2$. Is there a significant difference in mean weight loss between the two programs? Why?
- (b) Test $H_0 : \mu_1 = \mu_2$ versus $H_a : \mu_1 \neq \mu_2$ at the $\alpha = 0.10$ significance level. *You must cite the test statistic and critical value, plot the rejection region, and state your conclusion.* Is there a significant difference in mean weight loss between the two programs? Why?
- (c) Find the p -value for the test in (3b). According to the p -value, is there a significant difference between the two weight loss programs? Why?
4. Suppose we wish to test $H_0 : \mu = 88$ versus $H_a : \mu \neq 88$ at the $\alpha = 0.05$ significance level. If the sample mean $\bar{x} = 89.12$, the population standard deviation $\sigma = 3.5$, and the p -value for the test is 0.0250, find a 95% confidence interval for μ .
5. Scores on a certain exam follow a normal distribution with mean μ and standard deviation σ (unknown). Suppose we wish to test $H_0 : \mu = 125$ versus $H_a : \mu \neq 125$ at the $\alpha = 0.10$ significance level. To this end, 28 subjects were randomly selected, the summary statistics \bar{x} and s were computed, and a 90% confidence interval for μ was found to be (112.24, 125.76). Find the p -value of the test.