Week 5 Homework Solutions

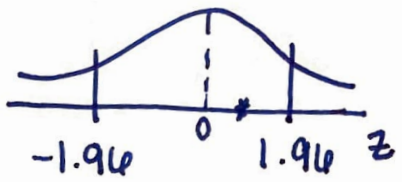
1. σ - known $\quad \bar{x} = 297.6 \quad \mu_0 = 295$

$\sigma = 12 \quad n = 50$

A.) $H_0: \mu = 295$

$H_a: \mu \neq 295$

B.) $\alpha = 0.05$



test statistic $= \dfrac{297.6 - 295}{12/\sqrt{50}} = 1.53$

P-value $\quad \alpha$

$0.126 \geq 0.05$

Reject H_0

Fail to Reject at 95% confidence. No evidence against the null was found.

C.) $\alpha = 0.01$

My conclusion would not change because interval would get even larger.

2. σ - unknown $\quad n = 85 \quad \bar{x} = 7.27 \quad \mu_0 = 9$

$DF = 84 \quad s = 6.38$

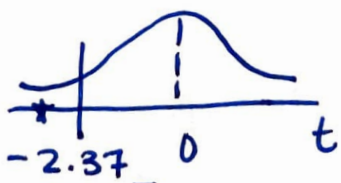
A.) $H_0: \mu \geq 9$

$H_a: \mu < 9$

(T.DIST.RT(2.50,84) pvalue $\quad \alpha$

$0.007 \leq 0.01$

Reject H_0



B) Test statistic

$t = \dfrac{7.27 - 9}{6.38/\sqrt{85}} = -2.50$ ← t.inv(0.01,84)

Reject H_0 @ 99% confidence level. Evidence was found in support of alternative hypothesis. That mean tenure is less than 9 years.

t - unknown $\bar{x} = 128.25$ $n = 40$ $\mu_0 = 130.0$

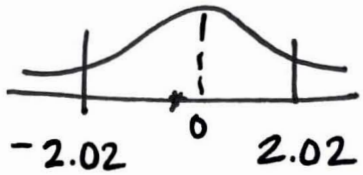
$s = 30.88$ $DF = 39$

A.) H_0: $\mu = 130.0$

H_a: $\mu \neq 130.00$

B) test statistic: $\alpha = 0.05$

$$t = \frac{128.25 - 130.0}{30.88 / \sqrt{40}} = -0.3585$$



t.inv(0.025, 39)

p-value α

$0.7289 \geq 0.05$

↓

t.dist.rt (0.35, 39)

reject H_0.

Fail to Reject @ 95% confidence

We did not find statistical evidence to reject the claim that the mean sale is $130,000 on average

4.) a)

H_0: $\mu_1 = \mu_2$

H_a: $\mu_1 \neq \mu_2$

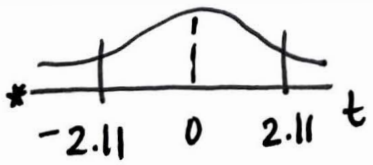
μ_1 = bobbies weekly expense

μ_2 = mickies weekly expense.

b.) $\alpha = 0.05$ using t-test: two sample means assuming unequal variances

t-stat: 9.73.

p-value: $0.00 \leq 0.05$



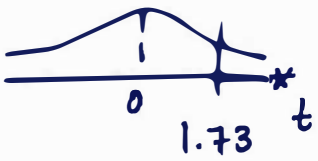
Reject H_0 @ 95% confidence. We found statistical evidence to support that the mean weekly expenses are different.

c)

$H_0: \mu_1 - \mu_2 \leq 5$

$H_a: \mu_1 - \mu_2 > 5$

D.) $\alpha = 0.05$ using same test by adding a hypothesized mean difference of 5



t-stat = 2.89

p-value = 0.005 ≤ 0.05

Reject H_0 @ 95% confidence. We found statistical evidence that the mean weekly expenses of mickies ~~customers~~ bobbies exceed by $5.00.