

Tutorial Session 7 - Hypothesis Testing (two tailed)

Extra Q1. Given $\bar{x} = 70$, $\sigma = 12$, $n = 50$, $\alpha = 0.01$, $\mu = 66$

$$H_0: \mu = 66$$

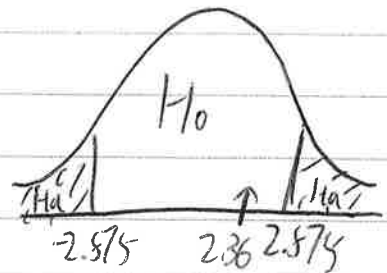
$$H_a: \mu \neq 66$$

Critical value

$$Z_{\alpha/2} = Z_{0.01/2} = Z_{0.005} = -2.575 \leq z \leq 2.575$$

Test value

$$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}} = \frac{70 - 66}{\frac{12}{\sqrt{50}}} \approx \frac{4}{1.7} \approx 2.36$$



\therefore Fail to reject H_0 . There is insufficient evidence to conclude that the average mean $\neq 66$.

Extra Q2. Given $\bar{x} = 40$, $\sigma = 6$, $n = 30$, $\alpha = 0.1$, $\mu = 35$.

$$H_0: \mu = 35$$

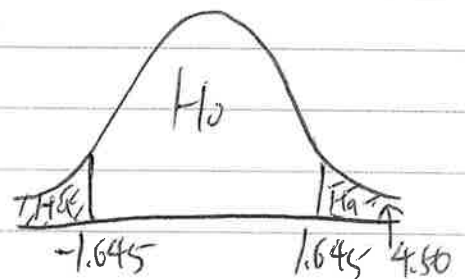
$$H_a: \mu \neq 35$$

Critical value

$$Z_{\alpha/2} = Z_{0.1/2} = Z_{0.05} = -1.645 \leq z \leq 1.645$$

Test value

$$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}} = \frac{40 - 35}{\frac{6}{\sqrt{30}}} \approx \frac{5}{1.1} \approx 4.56$$



\therefore Reject H_0 . There is enough evidence to conclude that the average mean $\neq 35$.

Extra Q3. Given $\bar{x} = 46$, $s = 5$, $n = 9$, $\alpha = 0.05$, $\mu = 50$

$$H_0: \mu = 50$$

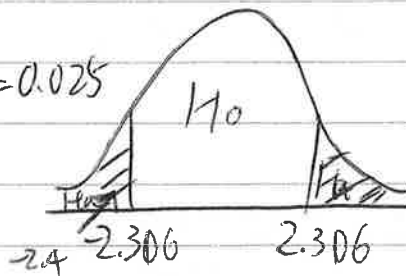
$$H_a: \mu \neq 50$$

Critical value

$$CI = 1 - \alpha = 1 - 0.05 = 0.95 = 95\%, \alpha/2 = 0.025$$

$$t_{df} = t_{n-1} = t_{9-1} = t_8$$

$$\Rightarrow -2.306 \leq t \leq 2.306$$



Test value

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} = \frac{46 - 50}{\frac{5}{\sqrt{9}}} \approx \frac{-4}{1.67} \approx -2.4$$

\therefore Reject H_0 . There is enough evidence to conclude that the average mean $\neq 50$.

2/0.49 - Heart Rate (P. 538)

Given $\bar{x} = 101$, $s = 15$, $n = 14$, $\alpha = 0.01$, $\mu = 99$

$$H_0: \mu = 99$$

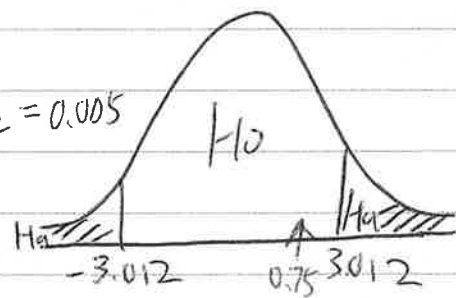
$$H_a: \mu \neq 99$$

Critical value

$$CI = 1 - \alpha = 1 - 0.01 = 0.99 = 99\%; \alpha/2 = 0.005$$

$$t_{df} = t_{n-1} = t_{14-1} = t_{13}$$

$$\Rightarrow -3.012 \leq t \leq 3.012$$



$$\text{Test value: } t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} = \frac{101 - 99}{\frac{15}{\sqrt{14}}} \approx \frac{2}{4} \approx 0.75$$

\therefore Fail to reject H_0 . There is insufficient evidence to conclude that the mean heart rate after 15 minutes of Wii bowling is different from the mean heart rate after 6 minutes walking on the treadmill.