Hypothesis Testing

1)

a) $H_0 = 25$, $H_1 : \neq 25$ → True

b) $H_0 : > 10$, $H_1 : = 10$ ⇒ false

c) $H_0 : = 0.1$, $H_1 : = 0.5$ ⇒ false

d) $H_0 : = 30$, $H_1 : \geq 30$ ⇒ false

e) $H_0 = 50$, $H_1 \neq 50$ → True

3) $H_0 = \mu = 34$

$H_1 = \mu \neq 34$

Significance Level = 1 %.

$\mu = 34$, $s = 8$, $n = 50$, $\bar{x} = 32.5$

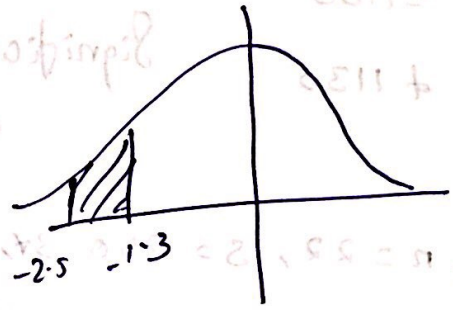
$\alpha = 0.01$

$$z = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{32.5 - 34}{8/\sqrt{50}} = -1.3$$

$P = 1 - (\text{area} - 1.33)$

$P = 1 + 1.33$

$P = 2.33$



Critical Value = ± 2.58

Computed Value of $z = -1.33$ falls in acceptance region

Accept Null hypothesis

2)

$H_0 = \mu = 52$ $\quad H_1 = \mu \neq 52$

$\sigma = 4.50$ $\quad$ Significance lev = 5%

$n = 100$ $\quad$ ie $\alpha = 0.05$

$\bar{x} = 52.80$

$$z = \frac{\mu - \bar{x}}{\sigma/\sqrt{n}} = \frac{52.80 - 52}{4.50/\sqrt{100}} = 1.77$$

$P = 1 - 0.9625$ $\quad$ Critical Value $= \pm 1.96$

$= 3.75$ $\quad$ $z = 1.78$ falls in Acceptance region,

$= 0.0375$

Accept Null hypothesis

The Mean Average Cost of book is 52/-

4) $H_0 = \mu = 1135$

$H_1 = \mu \neq 1135$ $\quad$ Significance level is 5%

$\alpha = 0.05$

$\mu = 1135$, $n = 22$, $S = 240.37$, $\bar{x} = 1031.32$

$$S = \sqrt{\frac{\Sigma (x - \bar{x})^2}{n-1}} = 240.37$$

$$z = \frac{\bar{x} - \mu}{S/\sqrt{n}} = \frac{1031.32 - 1135}{240.37/\sqrt{22}}$$

$= -2.02$

Critical Value of $z = \pm 1.96$

The value of $z = 2.57$ falls in rejection region

Reject Null hypothesis

Average Dental Expenses is not Accurate

5) $H_0 = \mu = 48,432$ ~~48,574~~

$H_1 = \mu \neq 48432$

$\sigma = 2000$

$n = 400$

$\bar{x} = 48,574$

$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{48,574 - 48432}{2000/\sqrt{400}}$$

$$= 1.42$$

Critical Value = ± 1.645

Value of $z = 1.42$ falls in Acceptance Region

Accept Null Hypothesis

6) $n = 19$

$H_0 = \mu = 32.28$

$H_1 = \mu \neq 32.28$

$\sigma = 1.29$

$\bar{x} = 31.67$

$\alpha = 0.05$

$$z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{31.67 - 32.28}{1.29/\sqrt{19}} = -2.1$$

Critical Value = ± 1.96

Value of $z = -2.1$ falls in rejection Region

Reject Null hypothesis

The average price is changed.

8) $n = 16$ $\quad t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$

$\mu = 10$

$\bar{x} = 12$ $\quad \frac{12-10}{1.5/\sqrt{16}}$ $\quad = 5.33$

$s = 1.5$

9) $\alpha = 0.01$ $\quad df = n - 1$

$n = 16$ $\quad df = 15$

$1 - \alpha = 0.99$

$\alpha = 0.01$

$t_{0.99} = -t_{0.01} = -2.602$

10) $n = 25$ $\quad \mu = 60$ $\quad s = 4$

$\alpha = 95\%$ $\quad df = n - 1$

$1 - 0.95 = 0.05$ $\quad = 25 - 1$

$\alpha = 0.05$ $\quad = 24$

~~$t_{0.05} < t < t_{0.10}$~~

$1 - (0.1 + 0.05)$

$= 0.85$

$t_{0.05} < t < t_{0.10}$

$s = 0.985$