Sec A (Mock Exam)

Shoukat Ali (Prob) 18K-1257

Q3)

$n = 55$

$\bar{x} = 148$

$S = 23$

$\alpha = 0.05$

$H_0 : \mu = 150$

$H_1 : \mu < 150$

$$t = \frac{\bar{x} - \mu}{\sigma}$$

$\sigma = S/\sqrt{n}$

$$t = \frac{148 - 150}{23/\sqrt{55}}$$

$t = -16.767$

$P(t < -16.767) \cong 0$

~~Hence~~
Since 0 lies in 0.05, we reject null Hypothesis.

Q5)

$\mu = 35$ cm
$\sigma = 3$ cm

1) $p(x < 26.6)$

$$z = \frac{26.6 - 35}{3}$$

$z = -2.8$

$p(z < -2.8) = \boxed{0.0026}$ or $\boxed{0.26\%}$

2) $p(x > 37.5)$

$$z = \frac{57.5 - 35}{3} = 0.833$$

~~$P(z < 0.$~~

$$P(z > 0.833) = 1 - 0.7967$$

$$= \cancel{0.1967}$$

$$= \boxed{0.2033}$$

or

$$\boxed{20.33\%}$$

(3) $P(30.7 < x < 37.4)$

$$z_1 = \frac{30.7 - 35}{3} = -1.433$$

$$z_2 = \frac{37.4 - 35}{3} = 0.8$$

$$P(-1.433 < z < 0.8) = P(z < 0.8) - P(z < -1.433)$$

$$= 0.7881 - 0.0764$$

$$= \boxed{0.7117}$$

or

$$\boxed{71.17\%}$$

Q2)

$\mu = 15$

$Z = \frac{x - \mu}{\sigma}$

$P(x < k) = 0.04$

$k = -1.75$

$-1.75 = \frac{x - \mu}{\sigma}$

$-1.75 = \frac{x - 15}{3}$

~~$x = 9.75$~~

$x = 9.75$

Q4)

$n_1 = 100$ $\quad$ $n_2 = 100$

$\bar{x}_1 = 90$

$S_1 = 20$

$n_1 = 100$ $\quad n_2 = 100$

$\bar{x}_1 = 200$ $\quad \bar{x}_2 = 190$

$s_1 = 40$ $\quad s_2 = 20$

$\alpha = 0.05$

$H_0 : \mu_1 - \mu_2 = 8$

$H_1 : \mu_1 - \mu_2 > 8$

~~$s_p = \sqrt{\bar{x} - x}$~~

$$s_p = \sqrt{\frac{s_1^2(n_1-1) + s_2^2(n_2-1)}{n_1 + n_2 - 2}}$$

$$s_p = \sqrt{\frac{(40)^2(99) + (20)^2(99)}{100+100-2}}$$

$s_p = 31.6227$

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - d_0}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$t = \frac{(200-190) - 8}{31.6227 \cdot \sqrt{1/100 + 1/100}}$$

$t = 0.447$

$v = 100 + 100 - 2 = 198$

$t_\alpha = 1.645$

$t < t_\alpha$, Hence null is accepted.