Assignment-12

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1) a) $\alpha = 1 - 0.95 = 0.05$

$$\frac{\alpha}{2} = 0.025$$

$n = 6$

$\bar{x} = 21.4$

$S^2 = 0.64$

Interval (μ) $= \bar{x} \pm T(\alpha/2, n-1) \times S/\sqrt{n}$

$= 21.4 \pm 2.57 \times \frac{0.8}{\sqrt{6}}$

$= 21.4 \pm 0.83$

$\therefore 20.57 \leq \mu \leq 22.23$

b) $\alpha = 1 - 0.99 = 0.01$

$\alpha/2 = 0.005$

$n = 12, \bar{x} = 5.7, S^2 = 9$

Interval (μ) $= \bar{x} \pm T(\alpha/2, n-1) \times S/\sqrt{n}$

$= 5.7 \pm 3.1 \times 3/\sqrt{12}$

$= 5.7 \pm 2.68$

$\therefore 3.02 \leq \mu \leq 8.38$

c) $\alpha = 1 - 0.9 = 0.1$

$\alpha/2 = 0.05$

$n = 15, \bar{x} = 42.1, s = 11$

Interval $(\mu) = \bar{x} \pm T(\alpha/2, n-1) \times s/\sqrt{n}$

$= 42.1 \pm 1.76 \times \frac{11}{\sqrt{15}}$

$= 42.1 \pm 4.99$

$\therefore 37.11 \leq \mu \leq 47.09$

d) $\alpha = 0.1$

$\alpha/2 = 0.05$

$n = 42, \bar{x} = 17.2, s = 8$

Interval $(\mu) = 17.2 \pm T(\alpha/2, n-1) \times \frac{s}{\sqrt{n}}$

$= 17.2 \pm 1.69 \times \frac{8}{\sqrt{42}}$

$= 17.2 \pm 2.07$

$\therefore 15.13 \leq \mu \leq 19.27$

2) $n = 196, \bar{x} = 1607, s = 0.21$

$\alpha = 0.5$

$\alpha/2 = 0.25$

Interval $(\mu) = 1607 \pm 1.97 \times 0.21/14$

$= 16.07 \pm 0.029$

a) $\alpha = 0.05$

$\alpha/2 = 0.025$ $\bar{x} = 17$, $n = 8$, $s = 4.53$

$$\text{Interval}(\mu) = 17 \pm 2.36 \times \frac{4.53}{\sqrt{8}}$$

$$= 17 \pm 3.77$$

$$13.23 \leq \mu \leq 20.77$$

b) $\alpha = 0.1$

$\alpha/2 = 0.05$, $n = 8$, $s = 4.53$, $\bar{x} = 17$

$$\text{Interval}(\mu) = 17 \pm 1.89 \times \frac{4.53}{\sqrt{8}}$$

$$= 17 \pm 3.02$$

$$\therefore 13.98 \leq \mu \leq 20.02$$

(c) $\alpha = 0.01$

$\alpha/2 = 0.005$, $n = 8$, $s = 4.53$, $\bar{x} = 17$

$$\mu \geq 17 - 3.49 \times \frac{4.53}{\sqrt{8}}$$

$$\mu \geq 11.41$$

c) mean = 17, s = 4.53 } A/c to 0.4

a) $\alpha = 0.05$

$\alpha/2 = 0.025$ $\quad \chi^2_{\alpha/2} = 16.013$

$1 - \alpha/2 = 0.975$ $\quad \chi^2_{1-\alpha/2} = 1.69$

$$\sqrt{\frac{(n-1)s^2}{\chi^2_{(\alpha/2,n-1)}}} \leq \sigma \leq \sqrt{\frac{(n-1)s^2}{\chi^2_{(1-\frac{\alpha}{2},n-1)}}}$$

$$\sqrt{\frac{7 \times 6.71}{16.013}} \leq \sigma \leq \sqrt{\frac{7 \times 6.71}{1.69}}$$

$$11.93 < \sigma < 36.13$$

b) Lower bound for $\sigma = 11.93$