

PS5 Solutions

Q1.

Sample size $n=25$

Sample mean $\bar{x}=81$

Populations standard deviation $\sigma=15$

Level of confidence $1-\alpha=0.99$

$$z_{\alpha/2}=2.58$$

$$\text{Margin of error} = E = z_{\alpha/2} \frac{\sigma}{n^{1/2}} = 7.74$$

$$\text{Left end point} = l = \bar{x} - E = 73.26$$

$$\text{Right end point} = r = \bar{x} + E = 88.74$$

Q2.

Populations standard deviation $\sigma=416$

Level of confidence $1-\alpha=0.95$

$$z_{\alpha/2}=1.96$$

Margin of error $=E=10$

$$\text{Sample size} = n = \left(\frac{z_{\alpha/2} \sigma}{E} \right)^2 = 6649$$

Q3.

Sample size $n=18$

Sample mean $\bar{x}=170.5$

Sample standard deviation $s=13.3$

Level of confidence $1 - \alpha = 0.99$

$$t_{n-1, \alpha/2} = 2.898$$

$$\text{Margin of error} = E = \frac{t_{n-1, \alpha/2} S}{n^{1/2}} = 9.0848$$

$$\text{Left end point} = l = \bar{x} - E = 161.4152$$

$$\text{Right end point} = r = \bar{x} + E = 179.5848$$

Q4.

Sample size $n = 40$

Sample mean $\bar{x} = 18.6$

Sample standard deviation $s = 9.486$

Level of confidence $1 - \alpha = 0.95$

$$t_{n-1, \alpha/2} = 2.021$$

$$\text{Margin of error} = E = \frac{t_{n-1, \alpha/2} S}{n^{1/2}} = 3.0312$$

$$\text{Left end point} = l = \bar{x} - E = 15.5688$$

$$\text{Right end point} = r = \bar{x} + E = 21.6312$$

Q5.

Sample size $n = 26$

Sample variance $S^2 = 26.7$

Level of confidence $1 - \alpha = 0.95$

$$X^2_{n-1, \alpha/2} = 40.6465$$

$$X^2_{n-1,1-\alpha/2} = 13.1197$$

$$\text{Left end point } = l = (n-1)s^2 / X^2_{n-1,\alpha/2} = 16.422$$

$$\text{Right end point } = r = (n-1)s^2 / X^2_{n-1,1-\alpha/2} = 50.878$$