Activity #10

C. compute a 99% CI for μ when $n = 100$ and $\bar{x} = 58.3$.

$$CI = \bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$Z_{\alpha/2} = Z_{0.01/2}$$

$$= Z_{0.005}$$

$$= \pm 2.58$$

$$99\%\ CI = 58.3 \pm \left(\frac{2.58 \times 3}{\sqrt{100}}\right)$$

$$= 58.3 \pm .774$$

$$= (57.53, 59.07)$$

Therefore, the 99% confidence interval for μ when $n=100$ and $\bar{x} = 58.3$ is $(57.53, 59.07)$

e. From the given information, the width of the 99% interval for μ is $w = 1.0$

$$n = \left(2Z_{\alpha/2} \cdot \frac{\sigma}{w}\right)^2$$

$$Z_{\alpha/2} = Z_{0.01/2}$$

$$= Z_{0.005}$$

$$= \pm 2.58$$

$$n = \left(\frac{2 \times 2.58 \times 3}{1}\right)^2$$

$$= 239.63$$

$$\approx 240$$

Therefore, the required sample size is 240.

D. From the given information, $n = 100$ and $\bar{x} = 58.3$

Use the following formula to compute the 82% confidence interval for μ:

$$CI = \bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$Z_{\alpha/2} = Z_{0.18/2}$$

$$= Z_{0.09}$$

$$= \pm 1.34$$

$$95\%\ CI = 58.3 \pm \left(\frac{1.34 \times 3}{\sqrt{100}}\right)$$

$$= 58.3 \pm 0.402$$

$$= (57.9, 58.7)$$

Therefore the confidence interval for μ when $n=100$ and $\bar{x} = 58.3$ is $(57.9, 58.7)$