

Stat 345 Solutions - Section 8.2-6 (2nd ed.)/8.2 (3rd ed.)

Problem 8-19(d)/8-8

Since σ is known and the distribution is normal, the general form of the confidence interval will be

$$\left(\bar{x} - z_{\alpha/2} \frac{\sigma}{\sqrt{n}}, \bar{x} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}}\right)$$

Here, $\bar{x} = 98$, $\sigma = 2$, $n = 9$, and $z_{\alpha/2} = 1.96$ since we want to construct a 95% CI. Thus, we have

$$\left(98 - (1.96) \frac{2}{3}, 98 + (1.96) \frac{2}{3}\right) \\ (96.69, 99.30).$$

Problem 8-21(e) (2nd ed.)/8-10 (3rd ed.)

Since σ is known and the distribution is normal, the general form of the confidence interval will be

$$\left(\bar{x} - z_{\alpha/2} \frac{\sigma}{\sqrt{n}}, \bar{x} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}}\right)$$

Here, $\bar{x} = 1.5045$, $\sigma = 0.01$, $n = 10$, and $z_{\alpha/2} = 2.58$ since we want to construct a 99% CI. Thus, we have

$$\left(1.5045 - (2.58) \frac{0.01}{\sqrt{10}}, 1.5045 + (2.58) \frac{0.01}{\sqrt{10}}\right) \\ (1.4963, 1.5127).$$

Problem 8-24 (c,d) (2nd ed.)/8-13 (a,b) (3rd ed.)

95% CI:

Since σ is known and the distribution is normal, the general form of the confidence interval will be

$$\left(\bar{x} - z_{\alpha/2} \frac{\sigma}{\sqrt{n}}, \bar{x} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}}\right)$$

Here, $\bar{x} = 3250$, $\sigma = \sqrt{1000}$, $n = 12$, and $z_{\alpha/2} = 1.96$ since we want to construct a 95% CI. Thus, we have

$$\left(3250 - (1.96) \frac{\sqrt{1000}}{\sqrt{12}}, 3250 + (1.96) \frac{\sqrt{1000}}{\sqrt{12}}\right) \\ (3232.1, 3267.9).$$

99% CI:

Here, $\bar{x} = 3250$, $\sigma = \sqrt{1000}$, $n = 12$, and $z_{\alpha/2} = 2.58$ since we want to construct a 99% CI. Thus, we have

$$\left(3250 - (2.58) \frac{\sqrt{1000}}{\sqrt{12}} , 3250 + (2.58) \frac{\sqrt{1000}}{\sqrt{12}} \right) \\ (3226.5 , 3273.5).$$

The width of the 99% CI is larger - higher confidence levels lead to wider intervals.