

Stat 345 Solutions - Section 8.3-5 (2nd ed.)/8.3 (3rd ed.)

Problem 8-28(c)/8-22

Since σ is unknown and the sample size is small, we will assume that the distribution of tire life is normal. Then, the general form of the confidence interval will be

$$\left(\bar{x} - t_{\alpha/2, n-1} \frac{\sigma}{\sqrt{n}}, \bar{x} + t_{\alpha/2, n-1} \frac{\sigma}{\sqrt{n}}\right)$$

Here, $\bar{x} = 60,139.7$, $s = 3645.94$, $n = 16$, and $t_{0.05/2, 15} = 2.131$ since we want to construct a 95% CI. Thus, we have

$$\left(60139.7 - (2.131) \frac{3645.94}{4}, 60139.7 + (2.131) \frac{3645.94}{4}\right) \\ (58,197.33, 62,082.07).$$

Problem 8-31(d) (2nd ed.)/8-25 (b) (3rd ed.)

Since σ is unknown and the sample size is small, we will assume that the distribution of polyunsaturated fatty acid level is normal. Then, the general form of the confidence interval will be

$$\left(\bar{x} - t_{\alpha/2, n-1} \frac{\sigma}{\sqrt{n}}, \bar{x} + t_{\alpha/2, n-1} \frac{\sigma}{\sqrt{n}}\right)$$

Here, $\bar{x} = 16.98$, $s = 0.1017$, $n = 6$, and $t_{0.01/2, 5} = 4.032$ since we want to construct a 99% CI. Thus, we have

$$\left(16.98 - (4.032) \frac{0.1017}{\sqrt{6}}, 16.98 + (4.032) \frac{0.1017}{\sqrt{6}}\right) \\ (16.81, 17.15).$$

We are 99% *confident* that this interval covers the true mean level of polyunsaturated fatty acid.