Answer on Question #83688 – Math – Statistics and Probability

Question

Because of staffing decisions, managers of the Gibson-Marimont Hotel are interested in the variability in the number of rooms occupied per day during a particular season of the year. A sample of 23 days of operation shows a sample mean of 284 rooms occupied per day and a sample standard deviation of 28 rooms.
Provide a 90% confidence interval estimate of the population variance (to 1 decimal).

Solution

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

$$s^2 = \frac{n}{n-1}\sigma^2$$

We have

$$n = 23$$

$$s^2 = \frac{23}{22} \cdot 28^2 = 819.64$$

$$\alpha = 0.1$$

Then

$$\frac{22 \cdot 819.64}{33.924^2} < \sigma^2 < \frac{22 \cdot 819.64}{12.338^2}$$

Answer:

$$15.7 < \sigma^2 < 118.5$$