Homework Solutions
Chapter 10 – Page 633

Exercise 3

(a) Let μ be the mean bacteria count per mL in the shipment. Then the hypotheses are

$$\begin{aligned} H_0: &\quad \mu = 5000 \\ H_1: &\quad \mu < 5000 \end{aligned}$$

(b) The formula for the test statistic is

$$z = \frac{\overline{x} - \mu_0}{\sigma/\sqrt{n}}.$$

We have $\overline{x} = 4995$, $\mu_0 = 5000$, $\sigma = 16$, and $n = 64$. So calculate

$$\begin{aligned} z &= \frac{4995 - 5000}{16/\sqrt{64}} \\ &= -\frac{5}{2} \\ &= -2.5. \end{aligned}$$

(c) This is a one-sided test to the left, so the p-value is

$$p\text{-value} = \texttt{normalcdf(-E99,-2.5)} = 0.0062.$$

(d) The results are significant at the 1% level because the p-value is less than 1%.