Answer on Question #51309 – Math – Statistics and Probability

The average price per gallon of unleaded regular gasoline was reported to be \$2.34 in northern Kentucky. Use this price as the population mean, and assume that the population standard deviation is \$0.20.

1. For a random sample of 64 service stations, find the standard deviation of the sampling distribution of the sample mean.

2. For a random sample of 100 service stations, find the standard deviation of the sampling distribution of the sample mean.

Solution

1. In the problem we know the following data: average price per gallon, which is equal to \$2.34, population standard deviation is \$0.20, random sample of 64 service stations. The standard deviation of the sampling distribution of the mean is given by

$$\sigma_{\bar{X}} = \frac{\sigma_{\text{price}}}{\sqrt{n_{\text{service stations}}}} = \frac{\sigma}{\sqrt{n}}$$

We know that $\mu_{\bar{X}} = \mu = \$2.34, n_{\text{service stations}} = 64, \sigma_{\text{price}} = \sigma = \$0.2.$

Now we can substitute the given values into the formula.

$$\sigma_{\bar{X}} = \frac{\$0.2}{\sqrt{64}} = \frac{\$0.2}{8} = \$0.025$$

Answer: the standard deviation of the sampling distribution of the sample mean is \$0.025.

2. For the given task we know the following data: average price per gallon, which is equal to \$2.34, population standard deviation is \$0.20, random sample of 100 service stations.

We apply the following formula:

$$\sigma_{\bar{X}} = \frac{\sigma_{\text{price}}}{\sqrt{n_{\text{service stations}}}} = \frac{\sigma}{\sqrt{n}}$$

Now we substitute the given values into the above formula and obtain the following result:

$$\sigma_{\bar{X}} = \frac{\$0.2}{\sqrt{100}} = \frac{\$0.2}{10} = \$0.02$$

Answer: the standard deviation of the sampling distribution of the sample mean is \$0.02.