Answer on Question #53371 – Math – Statistics and Probability

Question

An outdoor store sells 200 survival kits per month, with a population standard deviation (σ) of 15 kits. Assume the selling of survival kits is normally distributed.

What is the probability that the outdoor store will sell between 191 and 221 survival kits per month?

a. 1.4011
b. .4761
c. .9250
d. .6449

Solution

The variable is normally distributed with $\mu = 200$ and $\sigma = 15$. Since $\mu = 200$ and $\sigma = 15$, we have:

$$P(191 < X < 221) = P(191 - 200 < X - \mu < 221 - 200) =$$

$$= P\left(\frac{191 - 200}{15} < \frac{X - \mu}{\sigma} < \frac{221 - 200}{15}\right) =$$

$$= P\left(\frac{191-200}{15} < Z < \frac{221-200}{15}\right) = P(-0.6 < Z < 1.4).$$

Since $Z = \frac{X-\mu}{\sigma}$ is a standard normal random variable, using statistical tables we find that

$$P(-0.6 < Z < 1.4) = F(1{,}4) - F(-0{,}6) = 0.9192 - 0.2743 = 0.6449,$$

where F is the cumulative distribution function of a standard normal random variable.

Answer: d. .6449

Question

What is the probability that the outdoor store will sell more than 242 kits per month?

a. .4974
b. .0026
c. .9974
d. .8838

Solution

The variable is normally distributed with $\mu = 200$ and $\sigma = 15$. Since $\mu = 200$ and $\sigma = 15$, we have:

$$P(X > 242) = P(X - \mu > 242 - 200) = P\left(\frac{X-\mu}{\sigma} > \frac{242-200}{15}\right) = P\left(\frac{X-\mu}{\sigma} > 2.8\right) = P(Z > 2.8).$$

Since $Z = \frac{X-\mu}{\sigma}$ is a standard normal random variable, using statistical tables we find that

$$P(Z > 2.8) = 1 - F(2.8) = 1 - 0.9974 = 0.0026,$$

where F is the cumulative distribution function of a standard normal random variable.

Answer: b. .0026.