

The Burger Bin fast-food restaurant sells a mean of 24 burgers an hour and its burger sales are normally distributed. If hourly sales fall between 24 and 42 burgers 49.85% of the time, the standard deviation is _____ burgers.

- A. 18
- B. 3
- C. 6
- D. 9

Solution:

Standard Deviation - a measure of how spread out or dispersed the data in a set are relative to the set's mean. The normal random variable of a standard normal distribution is called a standard score or a z-score. The normal random variable X from any normal distribution can be transformed into a z score from a standard normal distribution via the following equation:

$$z = (x - \mu) / \sigma$$

Where x (in our case $x = 42$) is a normal random variable, μ (in our case $\mu = 24$) is the mean, and σ is the standard deviation. Because any normal random variable can be "transformed" into a z score, the standard normal distribution provides a useful frame of reference. Between 24 and 42 burgers 49.85%, 99.7 of a normal distribution lies within 3 standard deviations from the mean: $\frac{99.7}{2} = 49.85\%$ represents the right side

$$z = \frac{(X - \mu)}{\sigma} = 3$$

Standard of deviation is 6: as:

$$z = \frac{(42 - 24)}{6} = 3$$

We took $42 - 24$ which equals 18 and divided by the number of standard deviations above the mean, which are 3. This gives us $\frac{18}{3}$ which equals 6.

Answer: With a mean of 24 burgers an hour is 6.

Variant - C. 6.