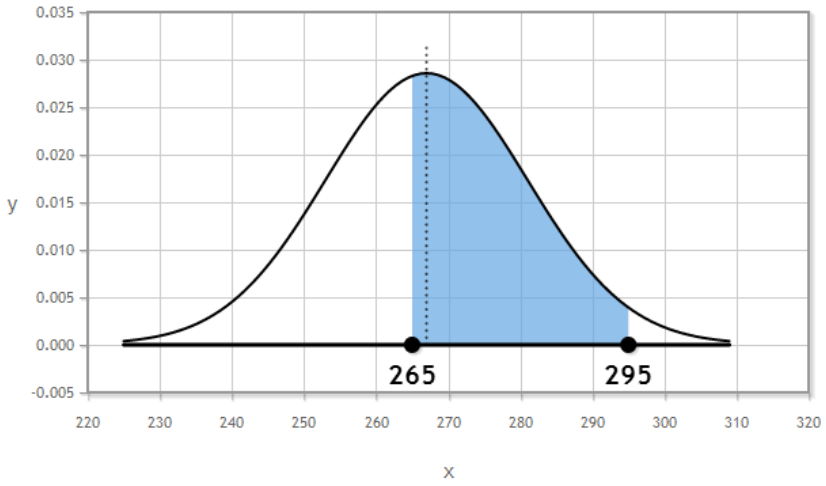
Answer on Question # 32118 – Math – Statistic and Probability

Lengths of pregnancies of humans are normally distributed with a mean of 267 days and a standard deviation of 14 days. Use the Empirical Rule to determine the percentage of women whose pregnancies are between 265 and 295 days.

Solution.

Step 1: Sketch the curve.

The probability that $265 < X < 295$ is equal to the blue area under the curve.



Step 2:

Since $\mu = 267$ and $\sigma = 14$ we have:

$$P\,(\,265 < X < 295\,) = P\,(\,265 - 267 < X - \mu < 295 - 267\,) = P\left(\,\frac{265-267}{14} < \frac{X-\mu}{\sigma} < \frac{295-267}{14}\right)$$

Since $Z = \frac{x-\mu}{\sigma}$, $\frac{265-267}{14} = -0.14$ and $\frac{295-267}{14} = 2$ we have:

$$P\,(\,265 < X < 295\,) = P\,(\,-0.14 < Z < 2\,)$$

Step 3: Use the standard normal table to conclude that:

$$P\,(\,-0.14 < Z < 2\,) = 0.5329$$

Answer: 53.3%