

A statistics professor plans classes so carefully that the lengths of the classes are uniformly distributed between 49.0 and 56.0 minutes.

\*Find the probability that a given class period runs less than 51.25 minutes.

The probability density function is a function that describes the relative likelihood for this random variable to take on a given value. The probability for the random variable to fall within a particular region is given by the integral of this variable's density over the region.

The probability density function of the continuous uniform distribution is:

$$f(x) = \begin{cases} \frac{1}{b-a}, & \text{for } a \leq x \leq b \\ 0, & \text{for } x > a \text{ or } x < b \end{cases}$$

a and b - are minimum and maximum values

Therefore, by definition probability density function, probability that a given class period runs less than 51.25 minutes:

$$p(x < 51.25) = \int_{-\infty}^{51.25} f(x)dx = \int_{49}^{51.25} \frac{1}{56-49} dx = \frac{1}{7} * x \Big|_{49}^{51.25} = \frac{2.25}{7} \approx 32.1 \%$$

Answer: 32.1 %