1 | Mean value theorem for integrals def

If $f(X)$ is continuous over an interval a, b, then there is at least one point $c \in [a, b]$ s.t.

$$f(c) = \frac{1}{b-a} \int_a^b f(x)dx$$

or equivalently,

$$\int_a^b f(x)dx = f(c)(b-a)$$

for some $c \in [a, b]$

1.1 | intuition

The mean of an interval will be less than the minimum and more than the maximum value of f along that interval. If f is continuous along the interval, then by the intermediate value theorem, there must be some point where $f(c)$ equals the mean value.