# Normal Distribution Intuition

**Definition:** In probability theory, the normal (or Gaussian or Gauss or LaplaceGauss) distribution is a very common continuous probability distribution. Normal distributions are important in statistics and are often used in the natural and social sciences to represent real-valued random variables whose distributions are not known. A random variable with a Gaussian distribution is said to be normally distributed and is called a normal deviate. Wikipedia

**Probability Density Function:**

$$p(x) = \frac{1}{a\sqrt{2\pi}} \exp\left(-\frac{(x-\mu)^2}{2\sigma^2}\right) \tag{1}$$

**Cumulative Function:**

$$p(x) = \frac{1}{a\sqrt{2\pi}} \exp\left(-\frac{(x-\mu)^2}{2\sigma^2}\right) \tag{2}$$