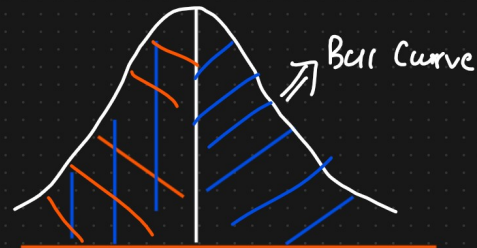
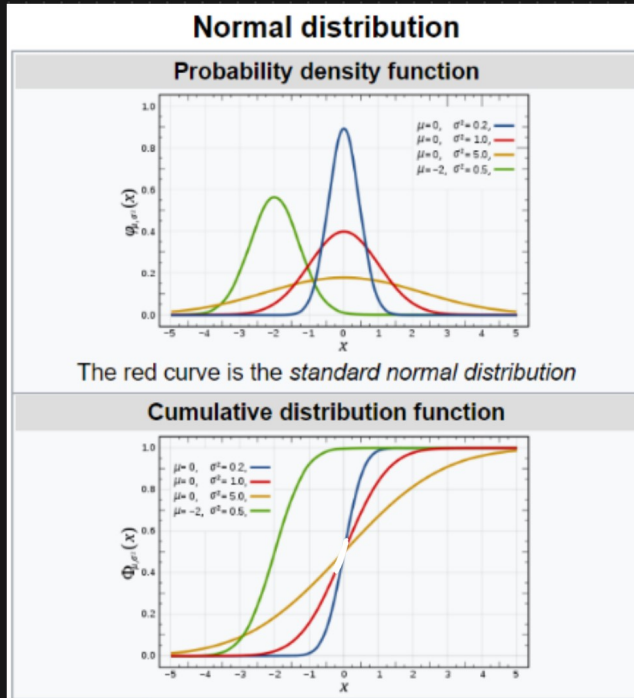


# Normal / Gaussian Distribution (pdf)

In statistics, a normal distribution or Gaussian distribution is a type of continuous probability distribution for a real-valued random variable.



$$\mu = \text{median} = \text{mode}$$

Notation  $N(\mu, \sigma^2)$

Parameters :

- $\mu \in \mathbb{R} = \text{mean}$
- $\sigma^2 \in \mathbb{R} > 0 = \text{variance}$
- $x \in \mathbb{R}$

$$\underline{\underline{\text{PDF}}} = \frac{1}{\sigma \sqrt{2\pi}} e^{-\frac{1}{2} \left( \frac{x - \mu}{\sigma} \right)^2}$$

Mean of Normal Distribution

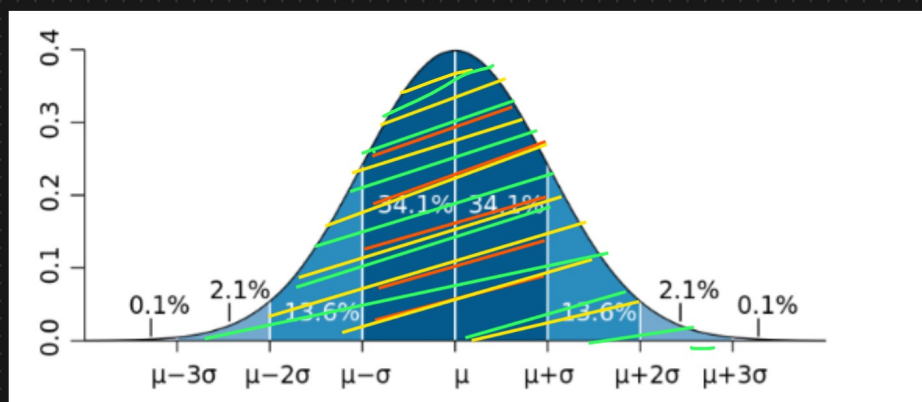
mean =  $\mu$  = Average

Variance & Std

$$\text{Var} = \sigma^2$$

$$\sigma = \sqrt{\text{Var}}$$

## Empirical Rule of Normal Distribution



68-95-99.7%

$X = \{$

100

$\}$

Probability

$$Pr(\mu - \sigma \leq X \leq \mu + \sigma) \approx 68\%$$

$$Pr(\mu - 2\sigma \leq X \leq \mu + 2\sigma) \approx 95\%$$

$$Pr(\mu - 3\sigma \leq X \leq \mu + 3\sigma) \approx 99.7\%$$

Examples : ① Height of the student in the class

② Height of the " " " "

③ IRIS DATASET {sepal width}

Q-Q plot {Quantile Quantile Plot}