

## Probability and Statistics

Combination vs. Permutation:

You use *combination* when the order does not matter.

You use *permutation* when the order does matter.

$$\text{Combination formula} = \frac{n!}{(n-r)! \times r!}$$

$$\text{Permutation formula} = \frac{n!}{(n-r)!}$$

$$\text{st. dev} = \sigma = \sqrt{\frac{\Sigma(x - x_{avg})^2}{N}}$$

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

In a normal (or Gaussian) distribution, 68% of the data fall within 1 standard deviation of the mean.

95% of the data fall within 2 standard deviations of the mean, and 99.7% of the data fall within 3 standard deviations of the mean.