

Key Formulas for Business Statistics

Percentile:

- $\frac{p}{100(N+1)}$
- Used to determine the n^{th} percentile

Variance:

- Population: $\sigma^2 = \frac{\sum(X-\mu)^2}{N}$
- Sample: $s^2 = \frac{\sum(x-\bar{x})^2}{n-1}$
- Used to determine how dispersed the data set is from the mean

Standard Deviation:

- Population: $\sigma = \sqrt{\frac{\sum_{i=1}^N (x_i - \mu)^2}{N}}$
- Sample: $s = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$
- Used to determine the degree of variation of a data set

Coefficient of Variation:

- $CV = \frac{s}{\bar{x}}$
- Ratio between mean and standard deviation

Covariance:

- Population: $Cov(x, y) = \frac{\sum(X_i - \bar{x})(y_i - \bar{y})}{N}$
- Sample: $Cov(x, y) = \frac{\sum(X_i - \bar{x})(y_i - \bar{y})}{(N-1)}$
- Used to measure variability between two variables

Correlation Coefficient:

- Population: $\rho = \frac{Cov(x,y)}{\sigma_x \sigma_y}$
- Sample: $R = R_{xy} = \frac{Cov(x,y)}{s_x s_y}$
- Used when determining how good of a fit a linear equation is to a set of data

Probability Combinations:

- $C(n,r) = \frac{n!}{r!(n-r)!}$
- Used when determining how many combinations are possible when order doesn't matter

Binomial Probability Distribution:

- $P = {}_n C_x p^x (1-p)^{n-x}$
- Used when determining the probability of an event that either succeeds or fails

Hypergeometric Probability Distribution:

- $p(x) = \frac{|r x| |N-r n-x|}{|N n|}$
- Used when something is being pulled from the pool without replacement

Uniform Probability Distribution

- $\frac{1}{b-a}$
- Used when the probabilities of each event are equally likely

Exponential Probability Distribution

- $F(x) = 1 - e^{-x/b} \quad \beta = \mu$
- Used when determining the probability that a task will take a certain amount of time

Normal Probability Distribution

- $Z = \frac{x-\mu}{\sigma}$
- Used when converting random variables to Z-values

For more information on key formulas for business statistics, make an appointment with a [content tutor](#). Appointments are available in person at the [Student Success Center](#) or online.