

## KEY FORMULAS FOR BUSINESS STATS

### Percentile:

- $\frac{P}{100(N+1)}$
- Used to determine the nth percentile

### Variance:

- Population:  $\sigma^2 = \frac{\sum(x-\mu)^2}{N}$
- Sample:  $s^2 = \frac{\sum(x-y)^2}{n-1}$
- 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:  $Cov(x, y) = \frac{\sum(Xi-x)*(yi-y)}{N}$
- Sample:  $Cov(x, y) = \frac{\sum(Xi-x)*(yi-y)}{(N-1)}$
- 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:

- $P(X) = {}_n C_x p^x (1-p)^{n-x}$
- 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:

- $F(x) = 1 - e^{-x/\beta} \quad \beta = \mu$
- 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, visit a [tutor](#). All appointments are available in-person at the Student Success Center, located in the Library, or online. Adapted from Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2018). *Statistics for Business & Economics* (13<sup>th</sup> Edition). Boston, MA: Cengage Learning.