STA 215 Definitions and Interpretations Guide
Grand Valley State University

Note: The following guide provides definitions of commonly found symbols and topics in statistics and formatting of common statistical interpretations.

Statistical Symbols:

μ : Population mean
$\bar{x}$: Sample mean
p: Population proportion
$\hat{p}$: Sample proportion
σ : Population standard deviation
s : Sample standard deviation
σ^2 : Population variance
s^2 : Sample variance
n : Sample size
z^*, t^* : Critical values (confidence interval multipliers)
r : Pearson's correlation coefficient for a sample
R^2: Coefficient of determination
$\hat{\beta}_0$: Estimated y-intercept for linear regression
$\hat{\beta}_1$: Estimated slope for linear regression
$\hat{y}$: Predicted y value in linear regression
H_0 : Null hypothesis
H_a : Alternative hypothesis
α : Significance level
z : Z-score
t : t-test statistic
μ_1, μ_2 : Population mean of population 1 and 2 respectively
$\bar{x}_2, \bar{x}_2$: Sample mean of sample 1 and 2 respectively
μ_d : Difference in population means (usually $\mu_1 - \mu_2$)
$\bar{x}_d$: Difference in sample means (usually $\bar{x}_1 - \bar{x}_2$)
p_1, p_2 : Population proportion of population 1 and 2
$\hat{p}_1, \hat{p}_2$: Sample proportion of sample 1 and 2
Σ : Summation
χ^2 : Chi-square test statistic

Interpretations in Statistics:

For the following interpretations, fill in each part of the sentence(s) that are in bold and underlined, such as: **parameter**.

Be sure to write the parameter for confidence intervals out in words to provide further context in your interpretation. For confidence intervals for differences in two parameters, be sure to state which one is greater/lesser and why.

Confidence Intervals:

We are **Confidence Level**% confident that the true **parameter** is between **Lower limit** and **Upper limit**.

P-values:

Assuming H_0 is true, the probability of obtaining the value of our observed test statistic or one more extreme is **p-value**.

For concluding hypothesis testing, make sure to write out the H_0 and H_a in words. This provides further context in your conclusion.

Rejecting H_0:

Since our p-value is **less than/equal to α**, we have sufficient evidence to reject **H_0** and will support **H_a**.

Failing to reject H_0:

Since our p-value is greater than **α**, we fail to reject **H_0** and lack sufficient evidence to support **H_a**.

Coefficient of Determination (R^2):

$R^2 \cdot 100$% of the variation in **response variable** is accounted for by **explanatory variable**.

Slope in linear regression:

For every 1 **unit** increase in **explanatory variable**, we expect **response variable** to **increase/decrease** by **$|\hat{\beta}_1|$**.

***Y*- Intercept:**

The predicted value of **response variable** when **explanatory variable** is 0, is **$\hat{\beta}_0$**.

Residuals:

Having a negative residual means that the predicted value from our linear regression equation is too high. Moreover, if we have a positive residual it means that the predicted value was too low.