ECON 216 - Exam 3 Formula Sheet - Spring 2023 - Dr. Sara Esfahani

Expected Value of the Sample Mean

$$E(\bar{x}) = \mu$$

Standard Error of the Sample Mean

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

z-score or Standardized Values

$$z - score = \frac{x - \mu}{\sigma}$$

Interval Estimation for One Population Mean

$$\bar{x} \pm z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$$

$$\bar{x} \pm t_{\frac{\alpha}{2}} \frac{s}{\sqrt{n}}$$

Test Statistics for Hypothesis Tests for One Population Mean

$$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$$

Interval Estimation for the Difference Between Two Population Means

$$\bar{x_1} - \bar{x_2} \pm z_{\frac{\alpha}{2}} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

$$\bar{x_1} - \bar{x_2} \pm t_{\frac{\alpha}{2}} \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$$

Test Statistics for Hypothesis Tests About the Difference Between Two Population Means

$$z = \frac{(\bar{x_1} - \bar{x_2}) - D_0}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

$$t = \frac{(\bar{x_1} - \bar{x_2}) - D_0}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Degrees of Freedom: t Distribution with Two Independent Random Samples

$$df = \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\frac{1}{n_1 - 1}\left(\frac{s_1^2}{n_1}\right)^2 + \frac{1}{n_2 - 1}\left(\frac{s_2^2}{n_2}\right)^2}$$