Final Exam Formula Sheet

Measures of Central Tendency

$$\overline{x} = \frac{\Sigma X_i}{n} \tag{1}$$

$$\mu = \frac{\Sigma X_i}{N} \tag{2}$$

Measures of Variability

$$r = h - l \tag{3}$$

$$SS = \Sigma(X_i - \overline{x})^2 \qquad or \qquad SS = \Sigma(X_i - \mu)^2 \tag{4}$$

$$s = \sqrt{\frac{\Sigma(X_i - \overline{x})^2}{n-1}} \tag{5}$$

$$s^2 = \frac{\Sigma(X_i - \overline{x})^2}{n-1} \tag{6}$$

$$\sigma = \sqrt{\frac{\Sigma(X_i - \mu)^2}{N}} \tag{7}$$

$$\sigma^2 = \frac{\Sigma(X_i - \mu)^2}{N} \tag{8}$$

$$\sigma_{\overline{x}} = \frac{\sigma}{\sqrt{n}} \tag{9}$$

$$s_{\bar{x}} = \frac{s}{\sqrt{n}} \tag{10}$$

$$s_{(\bar{x}_1 - \bar{x}_2)} = \sqrt{\left[\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}\right]\left[\frac{n_1+n_2}{n_1 n_2}\right]} \tag{11}$$

$$s_p = \sqrt{\frac{s_1^2 + s_2^2}{2}} \tag{12}$$

$$s_{\bar{x}_d} = \sqrt{\frac{s_d^2}{n}} \tag{13}$$

Relationships in the World

$$r_{xy} = \frac{n\Sigma XY - \Sigma X \Sigma Y}{\sqrt{[n\Sigma X^2 - (\Sigma X)^2][n\Sigma Y^2 - (\Sigma Y)^2]}} \tag{14}$$

Reliability

$$\alpha = (\frac{k}{k-1})(\frac{s_y^2 - \sum s_i^2}{s_y^2}) \tag{15}$$

z

$$z_{\overline{x}} = \frac{\overline{x} - \mu_{\overline{x}}}{\sigma_{\overline{x}}} \tag{16}$$

$$z_i = \frac{X_i - \mu}{\sigma} \tag{17}$$

$$X_i = \mu + z_i\sigma \tag{18}$$

t

$$t_{\overline{x}} = \frac{\overline{x} - \mu_{\overline{x}}}{s_{\overline{x}}} \tag{19}$$

$$t_{(\overline{x}_1 - \overline{x}_2)} = \frac{\overline{x}_1 - \overline{x}_2}{s_{(\overline{x}_1 - \overline{x}_2)}} \tag{20}$$

$$t_{\bar{x}_d} = \frac{\bar{x}_d}{s_{\bar{x}_d}} \tag{21}$$

$$t_{r_{xy}} = \frac{r_{xy}\sqrt{n-2}}{\sqrt{1 - r_{xy}^2}} \tag{22}$$

F

$$F = \frac{MS_{between}}{MS_{within}} \tag{23}$$

$$MS_{between} = \frac{SS_{between}}{df_{between}} \tag{24}$$

$$MS_{within} = \frac{SS_{within}}{df_{within}} \tag{25}$$

$$SS_{between} = \Sigma\frac{(\Sigma x)^2}{n} - \frac{(\Sigma\Sigma x)^2}{nT} \tag{26}$$

$$SS_{within} = \Sigma\Sigma(x^2) - \Sigma\frac{(\Sigma x)^2}{n} \tag{27}$$

$$df_{between} = k - 1 \tag{28}$$

$$df_{within} = nT - k \tag{29}$$

Regression

$$\hat{y} = bX + a \tag{30}$$

$$b = \frac{\Sigma XY - \frac{\Sigma x \Sigma y}{n}}{\Sigma X^2 - \frac{(\Sigma X)^2}{n}} \tag{31}$$

$$a = \frac{\Sigma Y - b\Sigma X}{n} \tag{32}$$

Effect Sizes

$$d_z = \frac{\bar{x} - \mu_{\bar{x}}}{\sigma} \tag{33}$$

$$d_t = \frac{\bar{x} - \mu_{\bar{x}}}{s} \tag{34}$$

$$d_{(\bar{x}_1 - \bar{x}_2)} = \frac{\bar{x}_1 - \bar{x}_2}{s_p} \tag{35}$$

$$d_{\bar{x}_d} = \frac{\bar{x}_d}{s_d} \tag{36}$$

$$\eta^2 = \frac{SS_{between}}{SS_{total}} \tag{37}$$