FORMULA SHEET: CHAPTERS 8, 9 & 10

TEST VALUES:

t test for the mean: $t = \dfrac{\bar{x} - \mu}{\dfrac{s}{\sqrt{n}}}$

z test for the proportion: $z = \dfrac{\hat{p} - p}{\sqrt{\dfrac{pq}{n}}}$

z test for the difference of two means (independent samples):

$$z = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}}$$

t test for the difference of two means (independent samples), variances **not equal**:

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}$$

$(d.f. = the\ smaller\ of\ \ n_1 - 1\ and\ \ n_2 - 1)$

t test for the difference of 2 means (dependent samples):

$t = \dfrac{\bar{D} - \mu_D}{\dfrac{s_D}{\sqrt{n}}}$ where $s_D = \sqrt{\dfrac{\sum D^2 - \dfrac{\left(\sum D\right)^2}{n}}{n-1}}$

$(d.f. = n - 1)$

<u>z test</u> for the difference of 2 proportions:

$$z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\overline{p}\overline{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \qquad \text{where} \qquad \overline{p} = \frac{X_1 + X_2}{n_1 + n_2}$$

<u>Correlation Coefficient:</u>

$$r = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{\sqrt{n\left(\sum x^2\right) - \left(\sum x\right)^2}\sqrt{n\left(\sum y^2\right) - \left(\sum y\right)^2}}$$

<u>Regression Line Coefficients:</u>

$$a = \frac{\left(\sum y\right)\left(\sum x^2\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum x^2\right) - \left(\sum x\right)^2} \qquad b = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum x^2\right) - \left(\sum x\right)^2}$$