Mod 7 - Model

p = population proportion

$\hat{p}$ = sample proportion

$$\hat{p} = \frac{X}{n}$$

If $np \geq 10$ $n(1-p) \geq 10$

$\hat{p}$ has Normal Dist

$$\mu_{\hat{p}} = p$$

$$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$$

$$Z = \frac{\hat{p} - p}{\sigma_{\hat{p}}}$$

Confidence Intervals for p

Margin of Error $E = Z \cdot S_{\hat{p}}$

Conf	Z
90%	1.645
95%	1.96
99%	2.576

$\hat{p} - E$ lower — $\hat{p}$ — $\hat{p} + E$ upper

We are ___% confident that the proportion <in context> is between lower and upper.

$$S_{\hat{p}} = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Mod 8 - Model

$p_1 - p_2$ = difference of population proportions

$\hat{p}_1 - \hat{p}_2$ = difference of sample proportions

$$\hat{p}_1 = \frac{X_1}{n_1} \qquad \hat{p}_2 = \frac{X_2}{n_2}$$

If $n_1 p_1 \geq 10$, $n_2 p_2 \geq 10$

$n_1(1-p_1) \geq 10$ $n_2(1-p_2) \geq 10$

$\hat{p}_1 - \hat{p}_2$ has Normal Distribution

$$\mu_{\hat{p}_1 - \hat{p}_2} = p_1 - p_2$$

$$\sigma_{\hat{p}_1 - \hat{p}_2} = \sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}$$

$$Z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sigma_{\hat{p}_1 - \hat{p}_2}}$$

Confidence Intervals for $p_1 - p_2$

Margin of Error $E = Z \cdot S_{\hat{p}_1 - \hat{p}_2}$

Conf	Z
90%	1.645
95%	1.96
99%	2.576

$\hat{p}_1 - \hat{p}_2 - E$ — $\hat{p}_1 - \hat{p}_2$ — $\hat{p}_1 - \hat{p}_2 + E$

We are ___% confident that the difference of proportion <in context> is between lower and upper.

$$S_{\hat{p}_1 - \hat{p}_2} = \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n} + \frac{\hat{p}_2(1-\hat{p}_2)}{n}}$$