Section 9.1 ⇝ Intro to Chap 9
Tests for Comparing 2 Populations.

Proportions

One population

$$Z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}$$

sample prop. ($\hat{p}$) — pop. proportion (p) — std. dev. ($\sqrt{\frac{pq}{n}}$)

$$\text{Variance} = \frac{pq}{n}$$

Means

One Population

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

sample mean ($\bar{x}$) — pop. mean (μ) — std. dev. ($\sigma/\sqrt{n}$)

$$\text{Variance} = \frac{\sigma^2}{n}$$

Comparing 2 proportions

Statistic: $\hat{p}_1 - \hat{p}_2$

Comparing 2 Means

statistic: $\bar{x}_1 - \bar{x}_2$

What we know about differences:

1. The mean difference is the difference of the means.
2. The variance of differences is the sum of the variances
3. Std. dev. is the square root of variance
4. If x & y are from normal pop's then $x - y$ is a normal population.

For the statistic $\hat{p}_1 - \hat{p}_2$

$$Z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}}}$$

For the statistic $\bar{x}_1 - \bar{x}_2$

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