Achievable

AP STATISTICS DUMP SHEET

Categorical and quantitative data

Categorical data

- **One-proportion z-interval:** $\hat{p} \pm z^* \sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$
- **One-proportion z-test:** $z = \dfrac{\hat{p} - p_0}{\sqrt{\dfrac{p_0(1-p_0)}{n}}}$
- **Two-proportion z-interval:** $(\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\dfrac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \dfrac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$
- **Pooled proportion:** $\hat{p}_c = \dfrac{x_1 + x_2}{n_1 + n_2}$
- **Two-proportion z-test:** $z = \dfrac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}_c(1-\hat{p}_c)\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}}$
- **Type I error:** rejecting a true H_0. **Type II error:** failing to reject a false H_0. **Power:** the probability of correctly rejecting a false H_0
- Power increases when:
  - n increases
  - α increases
  - the effect size increases
  - variability decreases
- **p-value:** the probability, assuming H_0 is true, of a test statistic at least as extreme as the one observed

Quantitative data

- **t-distribution:** use when σ is unknown and sample data are used
- **One-sample t-interval:** $\bar{x} \pm t^* \dfrac{s}{\sqrt{n}}$
- **One-sample t-test:** $t = \dfrac{\bar{x} - \mu_0}{s/\sqrt{n}}$
- **Two-sample t-interval:** $(\bar{x}_1 - \bar{x}_2) \pm t^* \sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}$
- **Two-sample t-test:** $t = \dfrac{\bar{x}_1 - \bar{x}_2}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}$
- **Pooled standard deviation:** $s_p = \sqrt{\dfrac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1 + n_2 - 2}}$
- **Paired t-test:** $t = \dfrac{\bar{d} - \mu_{d,0}}{s_d/\sqrt{n}}$, where $d = x_1 - x_2$ within each pair
- Degrees of freedom:
  - One-sample t: $df = n - 1$
  - Paired t: $df = n_{\text{pairs}} - 1$