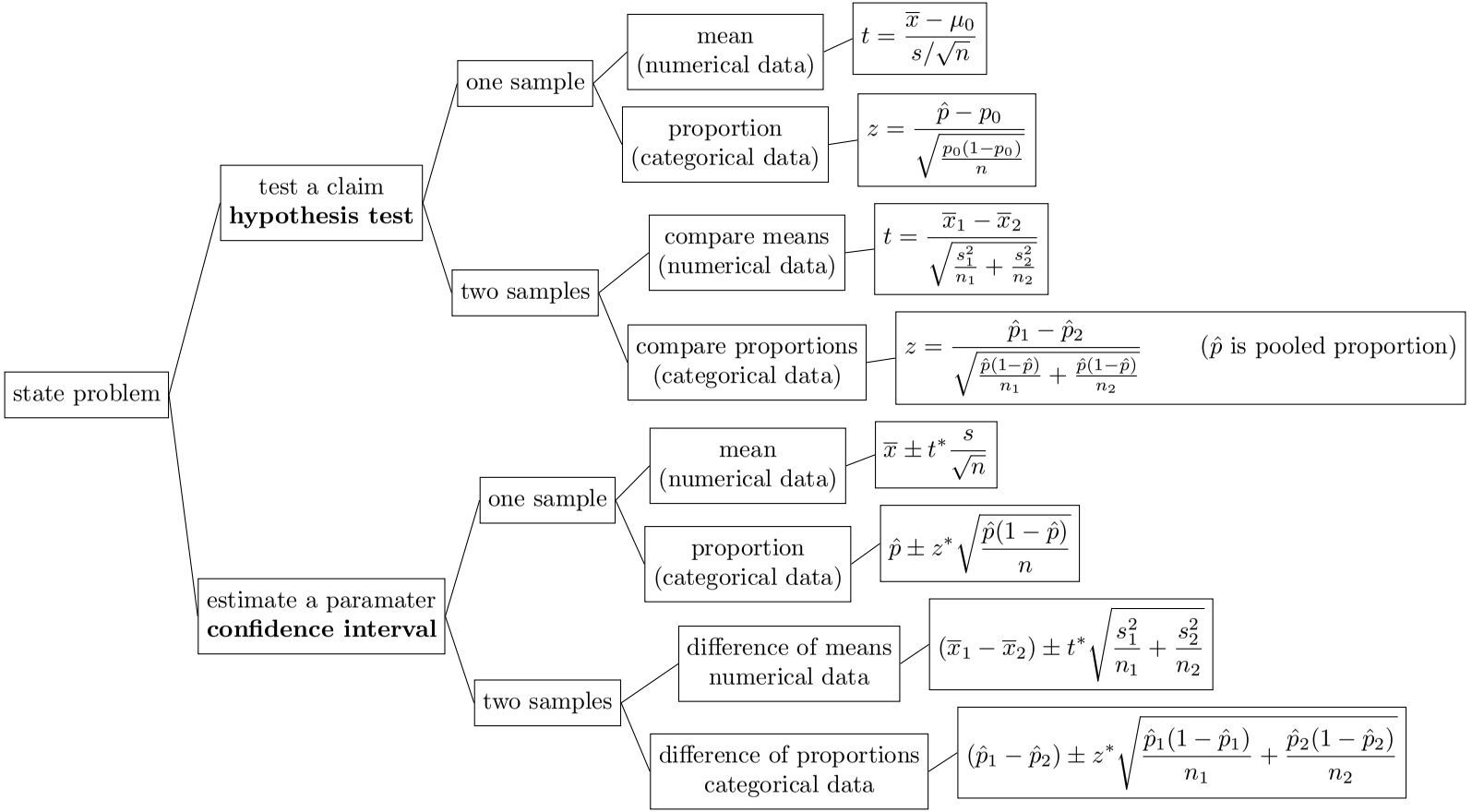
MATH 140 Inference Formulas

- CI for μ if σ is known : $\quad \overline{x} \pm z^* \dfrac{\sigma}{\sqrt{n}}$
- CI for μ if σ is unknown : $\quad \overline{x} \pm t^* \dfrac{s}{\sqrt{n}}$
- CI for p : $\quad \hat{p} \pm z^* \sqrt{\dfrac{\hat{p}(1-\hat{p})}{n}}$
- CI for $\mu_1 - \mu_2$: $\quad (\overline{x}_1 - \overline{x}_2) \pm t^* \sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}$
- CI for $p_1 - p_2$: $\quad (\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\dfrac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \dfrac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$
- 1-sample t : $\quad t = \dfrac{\overline{x} - \mu_0}{s/\sqrt{n}}$
- 2-sample t : $\quad t = \dfrac{\overline{x}_1 - \overline{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$
- test for 1 proportion : $\quad z = \dfrac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$
- test for 2 proportions : $\quad z = \dfrac{\hat{p}_1 - \hat{p}_2}{\sqrt{\frac{\hat{p}(1-\hat{p})}{n_1} + \frac{\hat{p}(1-\hat{p})}{n_2}}}$ $\qquad$ ($\hat{p}$ is pooled proportion)


state problem
test a claim
hypothesis test
one sample
mean
(numerical data)
$t = \frac{\overline{x} - \mu_0}{s/\sqrt{n}}$
proportion
(categorical data)
$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$
two samples
compare means
(numerical data)
$t = \frac{\overline{x}_1 - \overline{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$
compare proportions
(categorical data)
$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\frac{\hat{p}(1-\hat{p})}{n_1} + \frac{\hat{p}(1-\hat{p})}{n_2}}}$ ($\hat{p}$ is pooled proportion)
estimate a paramater
confidence interval
one sample
mean
(numerical data)
$\overline{x} \pm t^* \frac{s}{\sqrt{n}}$
proportion
(categorical data)
$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$
two samples
difference of means
numerical data
$(\overline{x}_1 - \overline{x}_2) \pm t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$
difference of proportions
categorical data
$(\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$