# MAT1372, Quiz10, Fall2025

ID:_____ Name: Sol

- This quiz consists of 1 question for a total of 10 points.
- You have 10 minutes to complete the quiz.
- Show all work and justify your answers.
- Wishing you success.

1. It is believed that nearsightedness affects about 8% of all children. In a random sample of 194 children, 21 are nearsighted. Conduct a hypothesis test for the following question: do these data provide evidence that the 8% value is inaccurate?

Prepare Build a hypothesis:

$H_0: p = 0.08$

$H_A: p \neq 0.08$

$n = 194$, $SE_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{p_0(1-p_0)}{n}} = \sqrt{\frac{0.08(0.92)}{194}} = 0.0195$

$p_0 = 0.08$ (null value)

set $\alpha = 0.05$

Check: Independence: these 194 children are randomly selected.

success-fail condition: $n \cdot p_0 = 194 \cdot 0.08 = 15.52 > 10$

$n(1-p_0) = 194 \cdot 0.92 = 178.48 > 10$

$\Rightarrow$ $p_0$ follows normal distribution

Calculate: From the sampling result, we have 21 out of 194 children are nearsighted. so $\hat{p} = \frac{21}{194} = 0.108$

To find p-value from $\hat{p}$, we have

$z = \frac{\hat{p} - p_0}{SE} = 1.435 \approx 1.44$ and

$P(z > 1.44) = 1 - P(z < 1.44) = 1 - 0.9251 = 0.0749$

and p-value $= 2 \times 0.0749 = 0.1498$

Conclude. since p-value $> \alpha$, then we fail to reject $H_0$. which means this sampling result supports $p = 0.8$.