We will use the normal distribution to approximate the binomial. We want to compute a p-value = probability of getting a sample proportion less than or equal to $\hat{p} = 0.208$. To use the normal distribution we compute a Z-score. The Z-score is called a <u>test statistic</u> (T.S.)

$$Z = \frac{\hat{p} - \text{mean of all } \hat{p} \text{ values}}{\text{std. error of } \hat{p} \text{ values.}} = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}$$ ← <u>Test Statistic</u>

III. Compute the test statistic

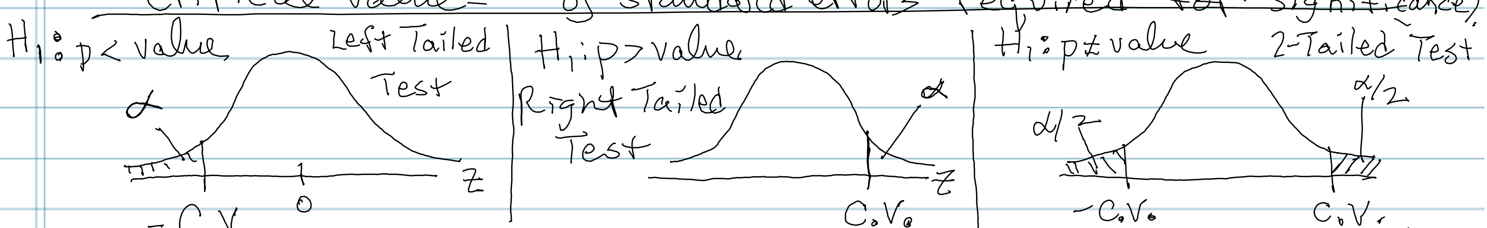
T.S.: $Z = \dfrac{\hat{p} - p}{\sqrt{\frac{pq}{n}}}$ ← get p from H_0; ← $q = 1-p$.

} z = # of std. errors that $\hat{p}$ is from p.

Ex: step III. $Z = \dfrac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} = \dfrac{.208 - .25}{\sqrt{\frac{.25 \cdot .75}{950}}} = -2.99$ ← <u>Highly significant!!</u>

IV Look up Z critical values in Table A1 (or the bottom row of A2.)

Critical value = # of standard errors required for significance)



Ex α = .05
Left Tailed
$H_1: p < .25$

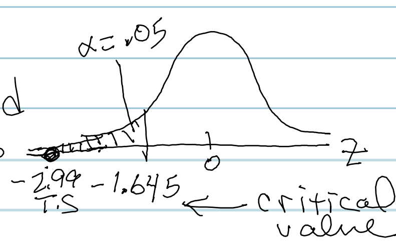


Table A2
df → Large (z) ⟶ 1.645
α = .05 one tail ↓