

Theory:

$$\hat{p} \sim N\left(p, \underbrace{\sqrt{\frac{p(1-p)}{n}}}_{SD}\right)$$

↑
pop.
proportion

Application #1: CI for p

$$\hat{p} - 2 \times SE \leq p \leq \hat{p} + 2 \times SE$$
$$SE = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Application #2: HT

$$\underbrace{H_0: p = p_0}_{\text{null}} \quad \text{vs.} \quad \underbrace{H_a: \begin{matrix} p < p_0 \\ p \neq p_0 \\ p > p_0 \end{matrix}}_{\text{alternative}} \quad \left. \vphantom{\begin{matrix} p < p_0 \\ p \neq p_0 \\ p > p_0 \end{matrix}} \right\} \begin{matrix} \text{one} \\ \text{of} \\ \text{these} \end{matrix}$$

compute
$$Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$$

then get p-value

6.52

$$H_0: p = .7 \text{ vs. } H_a: p > .7$$

$$\hat{p} = \frac{438}{616} = .711 \quad \left. \vphantom{\frac{438}{616}} \right\} \underline{p = .28}$$

$$z = \frac{\hat{p} - .7}{\sqrt{\frac{(.7)(.3)}{616}}} = .5946 \dots$$

Theory:

$$\bar{X} \sim N\left(\mu, \underbrace{\frac{\sigma}{\sqrt{n}}}_{SD}\right)$$

population mean

$$\sigma = \text{pop. SD}$$

$$\mu \approx \bar{X}$$

$$\sigma \approx S$$

$$\underbrace{S}_{\text{sample's SD}}$$

$$SE = \frac{S}{\sqrt{n}}$$

use the t -distribution
with $(n-1)$ degrees
of freedom : $t(n-1)$

$$t = \frac{\bar{X} - \mu_0}{s / \sqrt{n}}$$

#63 : $n = 1,000$

$$\mu = 28, \quad \sigma = 5$$

$$\bar{X} \sim N\left(28, \underbrace{\frac{5}{\sqrt{1000}}}\right)$$

.16

#86 $C = 999.$

$$\bar{X} = 88.3$$

$$S = 32.1$$

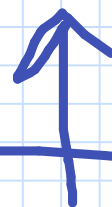
$$n = 15$$

$$\textcircled{8.3}$$



$$\frac{32.1}{\sqrt{15}}$$

$$\sqrt{15}$$



$$\boxed{\bar{X} \pm 2.977 \times SE}$$

Then get

$$88.3 \pm 24.84 =$$

$$63.46 \text{ to } 113.14$$

$$63.46 \leq \mu \leq 113.14$$