

# CONFIDENCE INTERVALS (part 2)

Example: Estimate the mean height of all male students in your school

	Mean	Proportion	S.D.	
Population	$\mu$	$p$	$\sigma$	parameter
Sample	$\bar{x}$	$\hat{p}$	$s$	statistics

Point Estimate  $\pm$  Margin of Error

## FOR MEANS

if  $n \geq 30$        $\bar{x} \pm z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$        $\sigma$  is known

if  $n < 30$        $\bar{x} \pm t_{df/2} \cdot \frac{s}{\sqrt{n}}$        $\sigma$  is unknown

## FOR PROPORTIONS

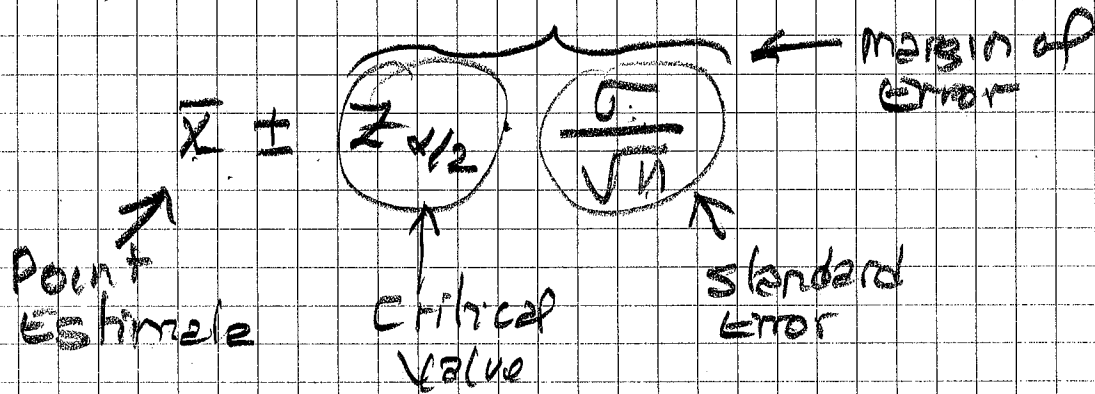
$n\hat{p} \geq 15$   
 $n\hat{q} \geq 15$

$$\hat{p} \pm z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

$\hat{p} = \frac{x}{n}$   
 $\hat{q} = 1 - \hat{p}$

$n$  = sample size  
 $x$  = # of obs in favor

# CONFIDENCE INTERVALS FOR MEANS WITH THE Z DISTRIBUTION

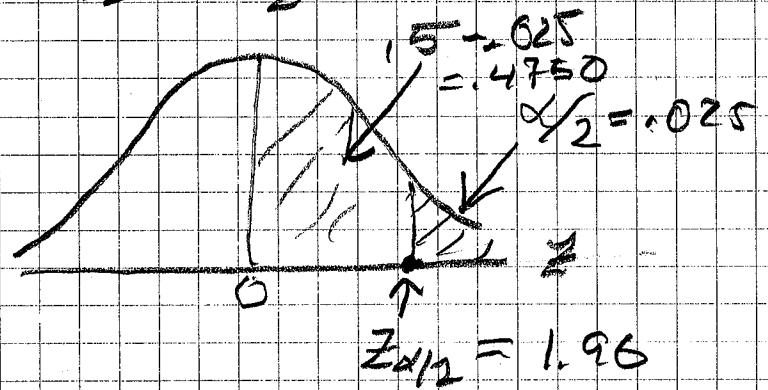
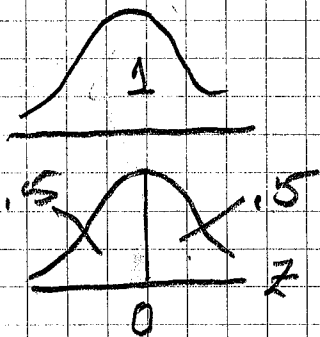


Example:  $n = 50$   
 $\bar{x} = 69$   
 $s = 2$

Estimate a 95% C.I.  
 Confidence Level = 95%  
 Confidence Coefficient = .95

$$\alpha = 1 - .95 = .05$$

$$\alpha/2 = \frac{.05}{2} = .025$$



95% C.I

$$69 \pm 1.96 \times \frac{2}{\sqrt{50}} = (68.44, 69.55)$$

$$= 69 \pm .554$$

Interpretation We are 95% confident that the mean height of all male students in your collage is between 68.44 and 69.55 inches