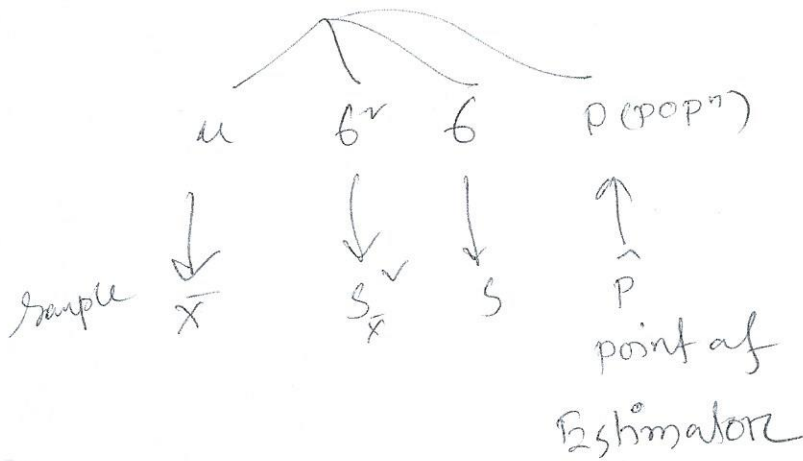


Inferential stats

Estimating a parameter

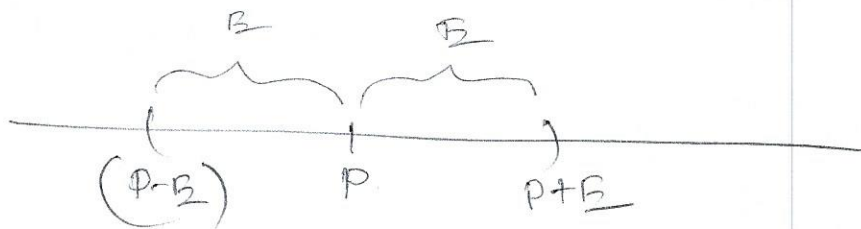
Testing a parameter



For proportions ^{proportion} P (parameter)
 best starting point \hat{P} .

Confidence Interval

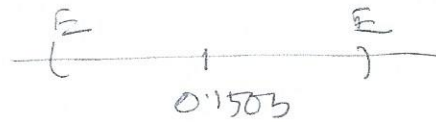
E = Margin of Error



$$\hat{p} = \frac{x}{n}$$

$$\hat{q} = 1 - \hat{p}$$

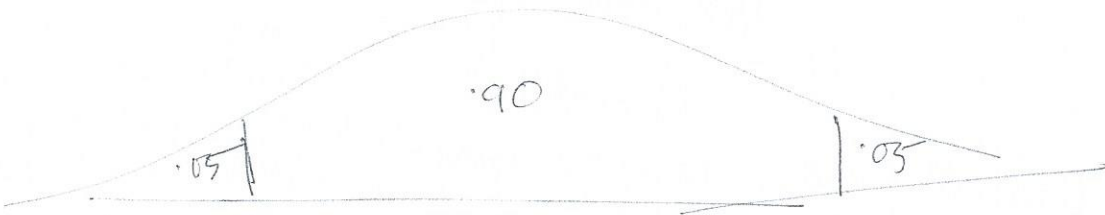
$$\hat{p} = \frac{221}{1470} = 0.1503$$



$$\hat{p} = \frac{1}{25}$$

$$\hat{p} = 0.04$$

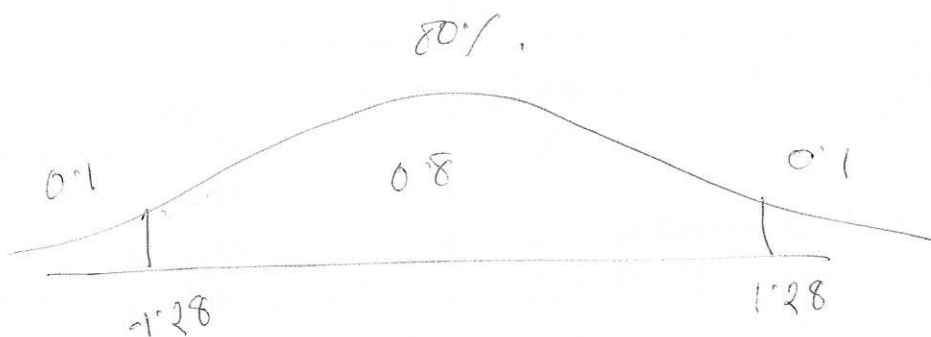
$$E = z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}}$$



$$\frac{1-0.9}{2} = \frac{0.1}{2}$$

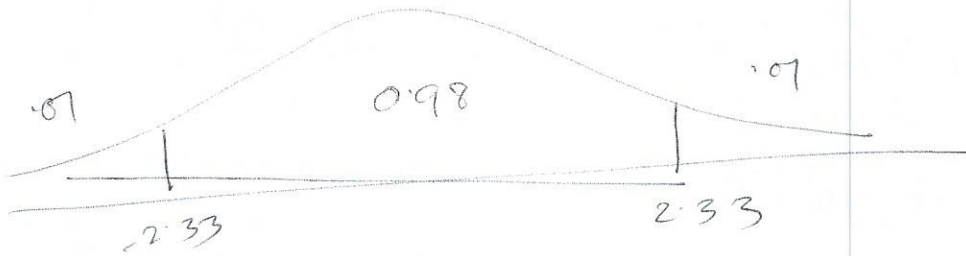
$$\frac{1.64 + 1.65}{2} = 1.645, \text{ z-score.}$$

Find the critical value for a) 80% CI
b) 98% CI



$$z =$$

$z_{\alpha/2} = 1.28$ (always report a positive z-score).



$$c = 0.98$$

$$z_{\alpha/2} = 2.33$$

1. $n = 1470$
 $x = 221$

2. $\hat{p} = \frac{221}{1470} = 0.1503$

3. Check $n\hat{p} \geq 5$
 $n\hat{q} \geq 5$

$$\hat{q} = 1 - 0.1503 = 0.8497$$

$$n\hat{p} = 1470 \times 0.1503 = 221 \geq 5$$

$$n\hat{q} = 1470 \times 0.8497 = 1249$$

Yes, the sampling distribution is approx. normal.

4. Conf. level $c = 0.9$.

Critical Value $z_{\alpha/2} = 1.645$

5. Max error of estimate

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

$$E = 1.645 \sqrt{\frac{(0.1503 * 0.8497) / 1470}{}}$$

don't round until final answer

6. $\hat{p} - E < P < \hat{p} + E$

$$0.1503 - 1.645 \sqrt{\frac{0.1503 * 0.8497}{1470}} < P$$

$$< 0.1503 + 1.645 \sqrt{\frac{0.1503 * 0.8497}{1470}}$$

$$0.1350 < P < 0.1656$$

ANSWER: with 90% confidence we believe that all people in the US who admire obama will vote as the president the most should fall between 13.5% and 16.56%.

1. $n = 850$

$x = 357$

2. $\hat{p} = \frac{357}{850} = 0.42$

$\hat{q} = 0.58$

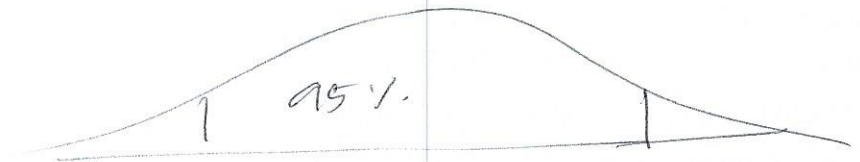
3. $np > 5$
 $nq > 5$

$850 \times 0.42 = 357$

$850 \times 0.58 = 493$

The sampling distribution is approx normal.

4. $C = 0.95$



$z = \frac{z}{2}$

5. Max Error of Estimate

$$E = 1.96 \sqrt{\left(\frac{0.42 \times 0.58}{850} \right)}$$

$$6. 0.42 - 1.96 \sqrt{\frac{0.42 \times 0.58}{850}} < P < 0.42 + 1.96 \sqrt{\frac{0.42 \times 0.58}{850}}$$

$$0.3857 < P < 0.4543$$

7. ANSWER

with 95% conf we believe that all students who balance their checkbooks should fall between 38.68% & 45.32% .

stat \rightarrow Tests \rightarrow prop Z int .