Summary for Section 7.2

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| CLT for $\overbar{P}$ | C.I. = Confidence Interval | Sample size n |
| 1. Binomial Conditions are valid
2. n$\overbar{P}\geq 5$
3. $n(1-\overbar{p})\geq 5$
4. Conditions 2 and 3 mean that your sample is big enough.

The CLT for $\overbar{P}$ says the sampling distribution for $\overbar{P} $ will be bell shaped with:$$μ\left(\overbar{P}\right)=P$$$$ and $$$σ\left(\overbar{P}\right)$ $≈$ $\sqrt{\frac{\overbar{P}(1-\overbar{P})}{n}}$ | P = Best Estimate $\pm Error$Best Estimate = $\overbar{P}$ = $\frac{x}{n}$Error = $Z\_{^{α}/\_{2}}\sqrt{\frac{\overbar{P}(1-\overbar{P})}{n}}$So P = $\overbar{P}$ $\pm $ $Z\_{^{α}/\_{2}}\sqrt{\frac{\overbar{P}(1-\overbar{P})}{n}}$Example:P = 0.3 $\pm $ 0.1Best Estimate = $\overbar{P}$ = 0.3Error = 0.1C.I. is P $\in \left[0.2, 0.4\right]$C.I. is P $\in $ [L , U] | You need a C.I. with high confidence (which means a specified level of confidence) and a small error (which means a specified E).So the question boils down to:How big the sample size should be to guarantee a high specified confidence and a small specified error.1. If $\overbar{P}$ is known from prior studies, then:

n = $\frac{\left(Z\_{^{α}/\_{2}}\right)^{2}\overbar{P}(1-\overbar{P} ) }{E^{2}}$ 1. If $\overbar{P}$ is unknown then :

n = $\frac{\left(Z\_{^{α}/\_{2}}\right)^{2}\*0.25 }{E^{2}}$ when computing the sample size n, you always round up. |

