

Margin of Error

critical value X standard deviation of statistic

*** As the sample size increases, it reduces the margin of error for any fixed confidence level.**

Conditions for Constructing a Confidence Interval

- **Random:** The data come from a well-designed random sample or randomized experiment.
- **Normal:** The sampling distribution of the statistic is approximately Normal.
- **Independent:** Individual observations are independent. When sampling without replacement, the sample size n should be no less than 10% of the population size N (the 10% condition).

Constructing a Confidence Interval for p

$$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}} \quad \text{or} \quad \sigma_{\hat{p}} = \sqrt{\frac{pq}{n}}$$

Standard error: When the standard deviation of a statistic is estimated from the data, the result is called standard error of the statistic

One-Sample z interval for a Population Proportion

An approximate level C confidence interval for p is :

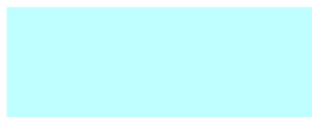
$$\hat{p} \pm z^* \sqrt{\frac{p(1-p)}{n}}$$

Where z^* is the critical value for the standard normal curve with area C between $-z^*$ and z^*

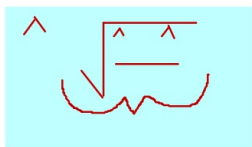
Confidence Interval for Proportions

Step #1: Define the parameter (p = the % of _____)

Step #2: Check conditions



Step #3: Create the interval



Common Z^* Values

90%	- 1.645
95%	- 1.96
99%	- 2.576

Step #4: Write your sentence



Mr. Vignolini's class took an SRS of 251 beads from the container and found 107 red beads and 144 white beads.

- a. Calculate and interpret a 90% confidence interval for p of red beads.**
- $$\hat{p} \pm z^* \sqrt{\frac{p(1-p)}{n}}$$

Do not forget to check $np \geq 10$ and $nq \geq 10$!