Formula Sheet

σ population standard deviation, s sample standard deviation, p population proportion, $\hat{p}$ sample proportion,

μ population mean, $\bar{x}$ sample mean, N population size, n sample size

$$z = \text{standard score} = \frac{\text{sample value} - \text{population value}}{\text{standard deviation}}$$

For Means

$$\text{z-score for distribution of sample means} = \frac{\text{sample mean} - \text{population mean}}{\frac{\text{standard deviation}}{\sqrt{\text{sample size}}}}$$

95% confidence interval for a population mean: $\text{margin of error} = E \approx \frac{2(\text{sample standard deviation})}{\sqrt{\text{sample size}}} = \frac{2s}{\sqrt{n}}$

To estimate a population mean with a certain margin of error of at most E, the size of sample should be at least

$n = \left(\frac{2\sigma}{E}\right)^2$ (If you don't know σ you can use s.)

For Proportions

$$\text{z-score for distribution of sample proportions} = \frac{\text{sample proportion} - \text{population proportion}}{\text{standard deviation}}$$

Standard deviation for a sample proportion $\sqrt{\frac{p(1-p)}{n}}$

95% confidence interval for a population proportion: $\text{margin of error} = E \approx 2\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

To estimate a population proportion with a certain margin of error of at most E, the size of sample should be at least

$n = \frac{1}{E^2}$