Distribution of the Sample Mean

Sample Size and Standard Error

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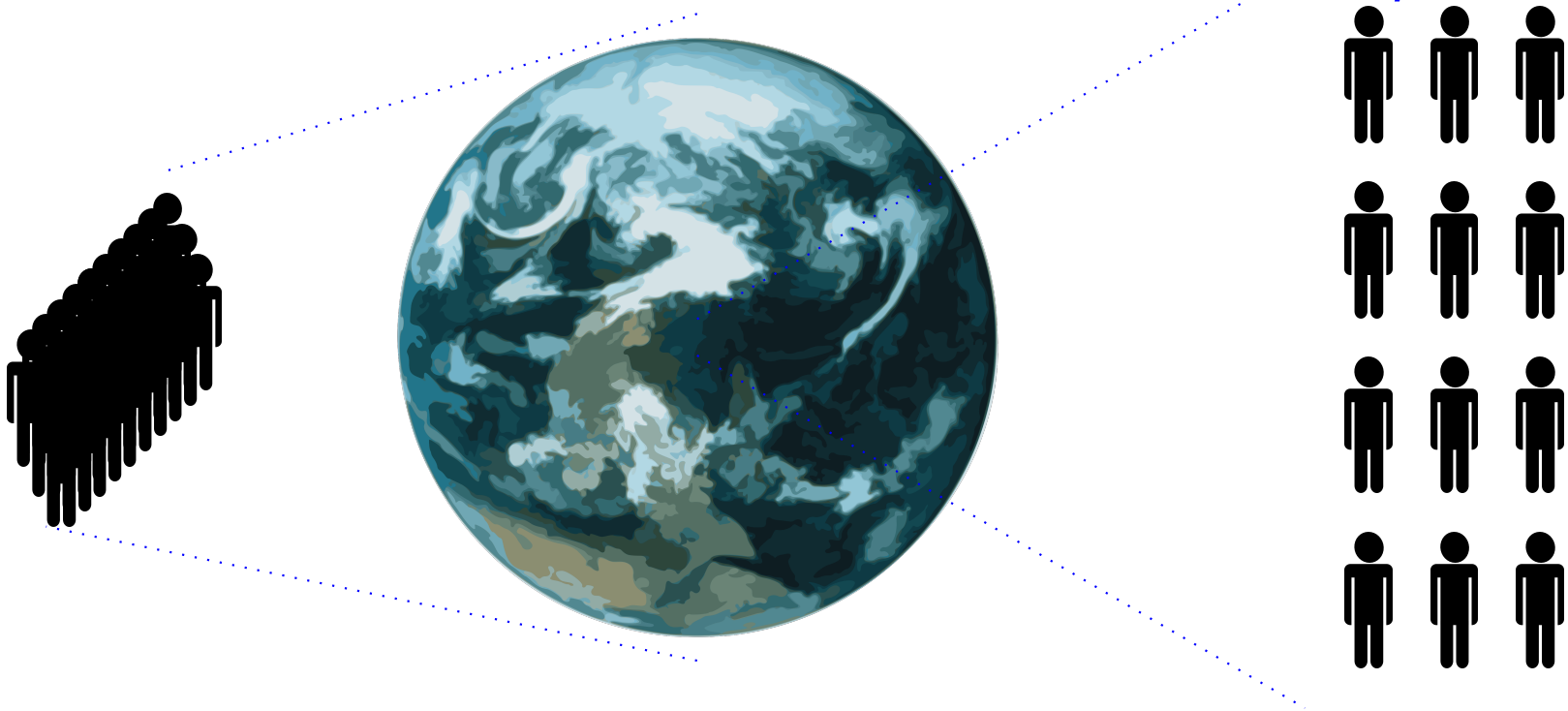
The Mean

Population Mean

Sample Mean



$$\mu = \frac{1}{\#E} \sum_{i \in E}^{n} x_i$$

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} x_i$$

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The Standard Error of the Sample Mean

Definition

The standard deviation σ of an estimator $\hat{\theta}$ is called the standard error.

$$\text{std.dev.}(X) = \sigma$$

$$\text{S.E.}(\bar{X}) = \frac{\sigma}{\sqrt{n}}$$

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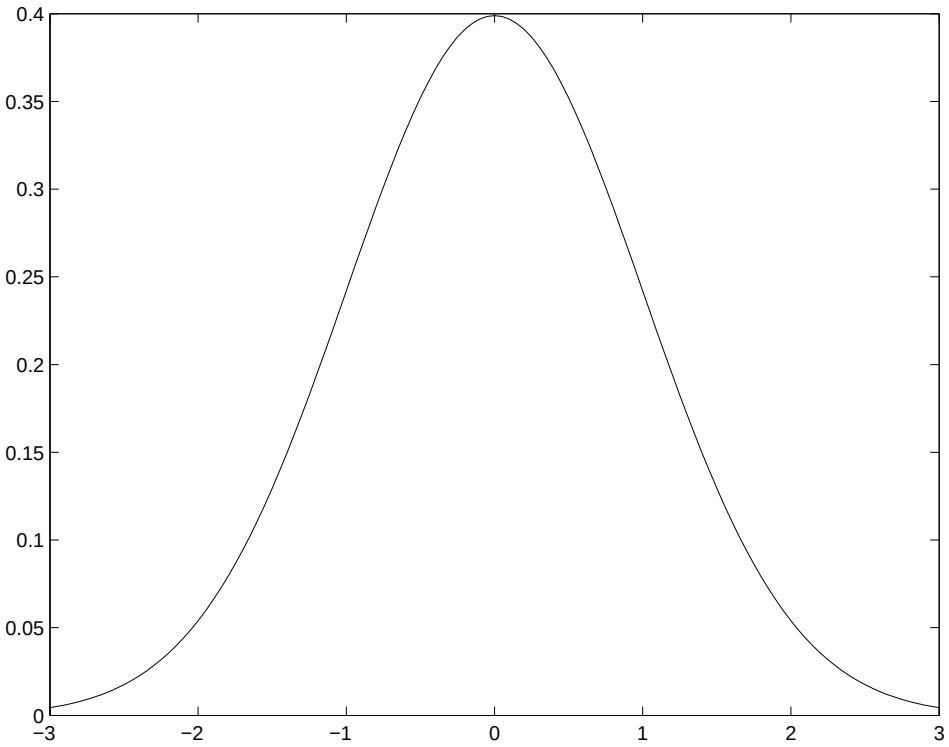
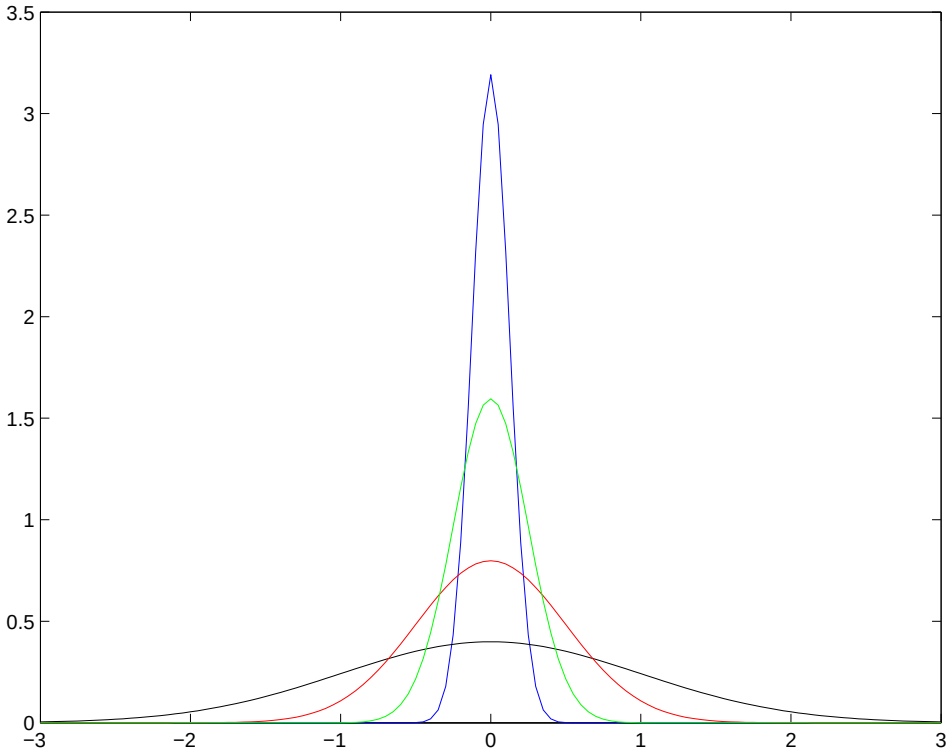
Probability Distribution of X

Standard Normal Distribution



$\mu = 0, \sigma = 1$

Probability Distribution of $\bar{X}$



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Summary

Definition

The standard deviation σ of an estimator $\hat{\theta}$ is called the standard error.

$$\text{std.dev.}(X) = \sigma$$

$$\text{S.E.}(\bar{X}) = \frac{\sigma}{\sqrt{n}}$$

Large Samples $\Rightarrow$ *Small Standard Error*

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