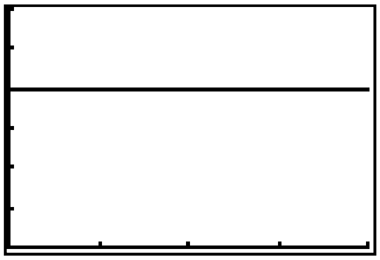
Uniform Distribution Revisited (Example 2 of 10/21/2008)

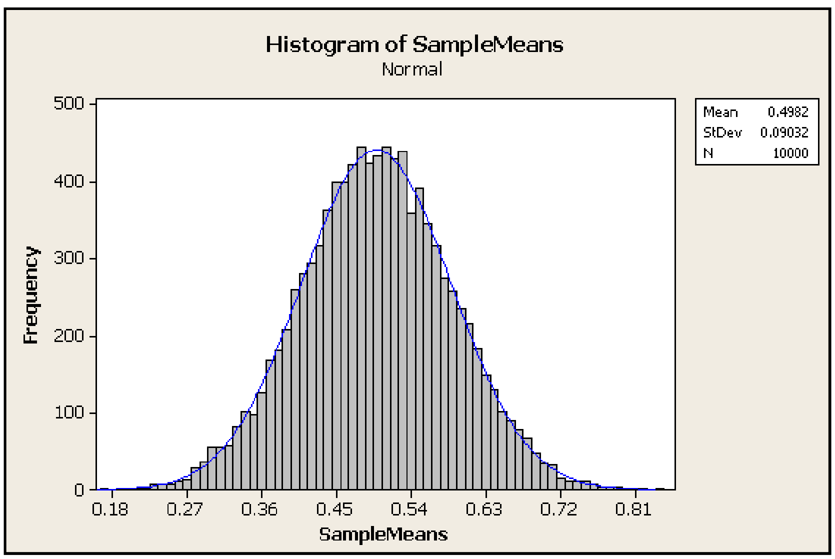
Example 2. Suppose we select a number at random from the interval 0 < x < 1. This distribution, known as a ***uniform distribution*** and its probability distribution f(x) is shown below.



It is the case that the mean of this distribution μ is 0.5 and the standard deviation σ is approximately 0.2887.

Displayed below is a histogram showing a simulated sampling distribution of the means of 10,000 samples of 10 trials each.

The mean of the sampled population, μ = 0.5
The mean of our simulated sampling distribution, $\mu_{\bar{x}}$ = 0.4982
The standard deviation of the sampled population, σ ≈ 0.2887
The standard deviation of the simulated sampling distribution, $\sigma_{\bar{x}} \approx 0.091 \approx \frac{\sigma}{\sqrt{10}}$



The Central Limit Theorem

Given a distribution with a mean μ and variance σ², the sampling distribution of the mean approaches a normal distribution with a mean (μ) and a variance σ²/N as N, the sample size, increases. Regardless of the shape of the original distribution, the sampling distribution of the mean approaches a normal distribution. Usually a normal distribution is approached very quickly as N increases. N is the sample size for each mean and not the number of samples. In a sampling distribution the number of samples is assumed to be infinite. The sample size is the number of scores in each sample; it is the number of measureements that goes into the computation of each mean. (This definition is adapted from David Lane's "Hyperstat Online Statistics Textbook" at http://davidmlane.com/hyperstat/index.html.)