**Activity 7.4.2 – The Role of Sample Size**

In **Activity 7.4.1** we saw how sample means from random samples vary. Some sample means are very close to the population mean; others are far away. We also saw that the standard error of sample means depends on the sample size. This activity provides you an opportunity to use technology to gain greater insight on this concept.

**Age of NBA Players in 2011**

The ages of NBA (National Basketball Association) players in 2011 were distributed as shown below with a mean of years and standard deviation of years.



Using Statkey we can examine simulated distributions of sample means for a variety of sample sizes.

**Exploring Distributions of Sample Means in Statkey**

Directions:

* Go to <http://lock5stat.com/statkey/index.html>
* Click on **Mean** in the Sampling Distributions section
* Click **Edit Data** to enter in NBAPlayers2011 data. Your teacher will give you an Excel spreadsheet with these data. Copy in the column of the player ages.
* Set **Samples of size *n*** to 10
* Click **Generate 1000 Samples**
* The simulation will show 1000 sample means. In the upper right corner, you will see the mean and standard deviation of the simulated sample means.

1. Complete the table below. For each sample size, record the mean and standard error (standard deviation) of 1000 simulated sample means.

|  |  |  |
| --- | --- | --- |
| Sample Size, *n* | Mean | Standard Error |
| 10 |  |  |
| 20 |  |  |
| 50 |  |  |
| 80 |  |  |
| 100 |  |  |

1. What happens to the mean of the distribution of sample means as the sample size increases?
2. What happens to the standard error of the distribution of sample means as the sample size increases?
3. Create a graph of the standard error as a function of sample size. Label and scale the axes appropriately.



1. What kind of mathematical function is this? Explain your reasoning.