THM: Given independent and identically distributed random variables X_i for $i = 1$ to n, we define the normalized sample average, Z, as follows:

$$Z \equiv \frac{\overline{X} - \mu}{\sigma / \sqrt{n}} \text{ where } \overline{X} \equiv \frac{1}{n} \sum_{i=1}^{n} X_i \, .$$

Then as n approaches infinity, the probability density function for Z approaches a standard normal (i.e., standard gaussian) distribution, (see [1]):

$$f_Z(z) \to \frac{1}{\sqrt{2\pi}} e^{-z^2/2} \text{ as } n \to \infty$$

REF: [1] Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, and Keying Ye, *Probability and Statistics for Engineers and Scientists,* 8th Ed., Upper Saddle River, NJ: Prentice Hall, 2007.