Normal Distribution Properties

Statisticians have been dealing with large samples since the end of the 1800’s, when Sir Francis Galton (first cousin to Charles Darwin), collected a large amount of data concerning the results of planting different sizes of peas. Since then, many distributions of data have been investigated. One such distribution is the **normal distribution**, which has the following properties.

1. It is symmetric to the left and right of the mean.
2. There is 68% of the data contained between \( \bar{x} - s \) and \( \bar{x} + s \).
3. There is 95% of the data contained between \( \bar{x} - 2s \) and \( \bar{x} + 2s \).
4. There is 99.7% of the data contained between \( \bar{x} - 3s \) and \( \bar{x} + 3s \).

Properties 1 and 2 imply the following:

![image of normal distribution with shaded region]

The shaded region below contains 68% of the total area.
Properties 1 and 3 imply the following:

The shaded region below contains 95% of the total area.

Properties 1 and 4 imply the following:

The shaded region below contains 99.7% of the total area.
Combining the information above into one diagram we obtain the percents of data as shown below.