

## 6.20: Normal Random Variables (2 of 6)

### Learning Objectives

- At these points, the curve changes the direction of its bend and goes from bending upward to bending downward, or vice versa. A point like this on a curve is called an **inflection point**. Every normal curve has inflection points at exactly 1 standard deviation on each side of the mean.
- [Click here to open this simulation in its own window.](#)

An interactive or media element has been excluded from this version of the text. You can view it online here: <http://pb.libretexts.org/sss/?p=250>

### Learn By Doing

<https://assessments.lumenlearning.co...sessments/3564>

Now we extend this idea to look at the probability of a value falling within 2 standard deviations of the mean or 3 standard deviations of the mean.

If  $X$  is a normal random variable with mean  $\mu$  and standard deviation  $\sigma$ , then

- To summarize using probability notation:

$$\begin{array}{l} \mathbf{1.} \ P(\mu - \sigma < X < \mu + \sigma) = 0.68 \\ \mathbf{2.} \ P(\mu - 2\sigma < X < \mu + 2\sigma) = 0.95 \\ \mathbf{3.} \ P(\mu - 3\sigma < X < \mu + 3\sigma) = 0.997 \end{array}$$

### Comment

Let's take a moment to look a bit deeper at what the empirical rule tells us.

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