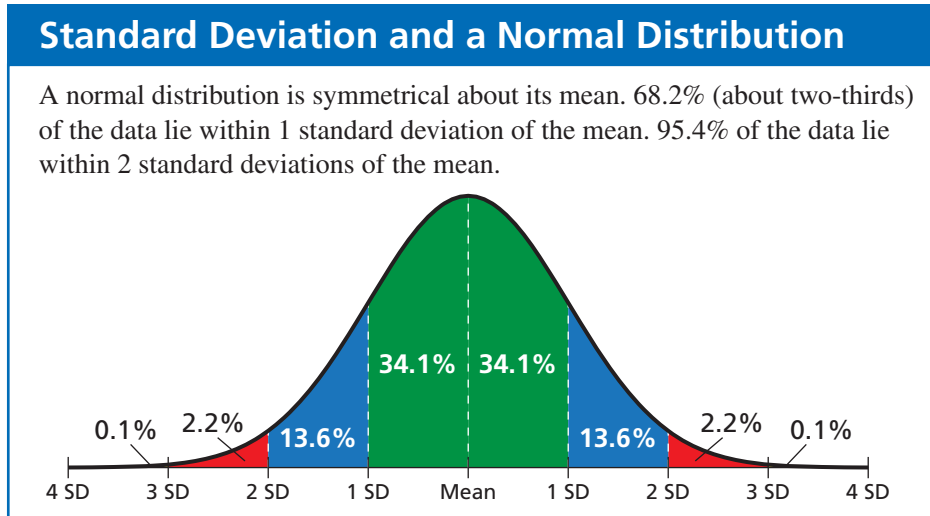


### Standard Deviation and Normal Distribution

In many naturally occurring data sets, a histogram of the data is often bell shaped. In statistics, such data sets are said to have a **normal distribution**.



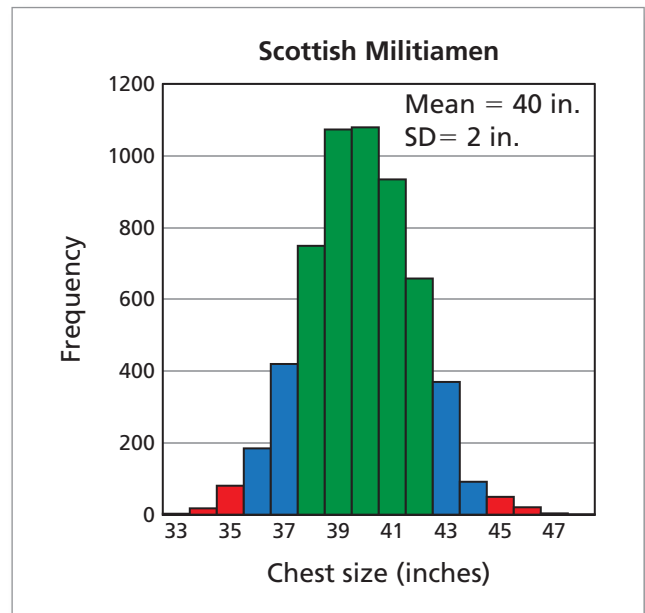
#### EXAMPLE 3 Analyzing a Famous Normal Distribution

A famous data set was collected in Scotland in the mid-1800s. It contains the chest sizes (in inches) of 5738 men in the Scottish Militia. What percent of the chest sizes lie within 1 standard deviation of the mean?



The *Thin Red Line* is a painting by Robert Gibb. It was painted in 1881. Only the left portion of the painting is shown above.

Chest Size	Number of Men
33	3
34	18
35	81
36	185
37	420
38	749
39	1073
40	1079
41	934
42	658
43	370
44	92
45	50
46	21
47	4
48	1



#### SOLUTION

The number of chest sizes within 1 standard deviation of the mean is  $749 + 1073 + 1079 + 934 + 658 = 4493$ . This is about 78.3% of the total, which is somewhat more than the percent predicted by a normal distribution.

#### ✓ Checkpoint

Help at [Math.andYOU.com](http://Math.andYOU.com)

What percent of the chest sizes lie within 2 standard deviations of the mean?