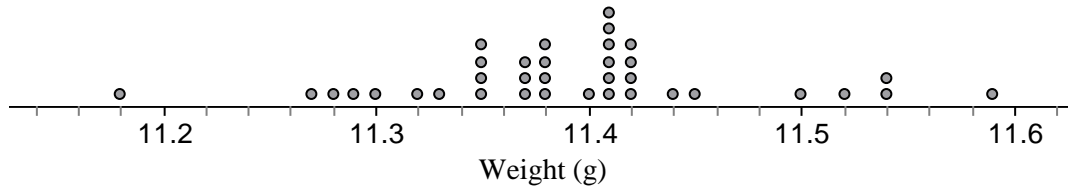


Investigating Normal Distributions

In this Activity, you will use several sets of data to explore an interesting property of Normal distributions. For each of the approximately Normal distributions below, calculate the percentage of values within one standard deviation of the mean, within two standard deviations of the mean, and within three standard deviations of the mean.

1. Here is a dotplot showing the weights (in grams) of 36 Oreo cookies. The mean of this distribution is 11.392 g and the standard deviation is 0.081 g.

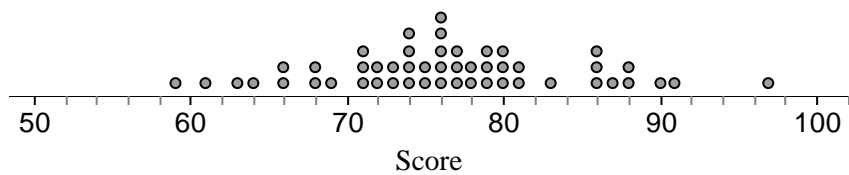


Mean \pm 1 SD: _____ to _____ % within 1 SD: _____

Mean \pm 2 SD: _____ to _____ % within 2 SD: _____

Mean \pm 3 SD: _____ to _____ % within 3 SD: _____

2. Here is dotplot showing the scores for 50 students on an algebra test. The mean of this distribution is 76.4 and the standard deviation is 7.9.

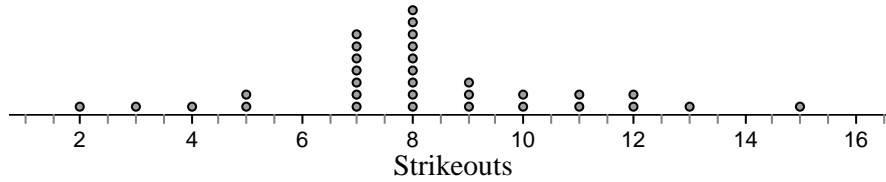


Mean \pm 1 SD: _____ to _____ % within 1 SD: _____

Mean \pm 2 SD: _____ to _____ % within 2 SD: _____

Mean \pm 3 SD: _____ to _____ % within 3 SD: _____

3. Here is a dotplot of Tim Lincecum's strikeout totals for each of the 32 games he pitched in during the 2009 regular season. The mean of this distribution is 8.2 with a standard deviation of 2.8.



Mean \pm 1 SD: _____ to _____ % within 1 SD: _____

Mean \pm 2 SD: _____ to _____ % within 2 SD: _____

Mean \pm 3 SD: _____ to _____ % within 3 SD: _____

4. All three of the distributions above were approximately Normal in shape. Based on these examples, about what percent of the observations would you expect to find within one standard deviation of the mean in a Normal distribution?

Within two standard deviations of the mean?

Within three standard deviations of the mean?

Investigating Normal Distributions—ANSWER KEY

1. Within one SD: $26/36 = 72\%$ are between 11.311 and 11.472.

Within two SD: $34/36 = 94\%$ are between 11.230 and 11.554.

Within three SD: $36/36 = 100\%$ are between 11.149 and 11.635.

2. Within one SD: $34/50 = 68\%$ are between 68.5 and 84.3

Within two SD: $48/50 = 96\%$ are between 60.6 and 92.2

Within three SD: $50/50 = 100\%$ are between 52.7 and 100.1

3. Within one SD: $23/32 = 72\%$ are between 5.4 and 11.0

Within two SD: $30/32 = 94\%$ are between 2.6 and 13.8

Within three SD: $32/32 = 100\%$ are between -0.2 and 16.6

4. Based on these examples, we should expect between 68% and 72% of the observations to be within one standard deviation of the mean. We should expect between 94% and 96% of the observations to be within two standard deviations of the mean. And we should expect about 100% to be within three standard deviations of the mean.