Exercises

1. If a list of numbers has a distribution that is well approximated by the normal distribution, what proportion of these numbers are within one standard deviation away from the list’s average?

(68.26%) or 68.26/100 – 0.6826 is the proportion of these numbers that are within one standard deviation away from the list’s average.

1. What proportion of these numbers are within two standard deviations away from the list’s average?

.9546 is the proportion of numbers within two standard deviations from the list’s average.

1. What proportion of these numbers are within three standard deviations away from the list’s average?

The proportion of numbers within three standard deviations from the list’s average is .9972.

1. Define y to be the weights of males on the control diet. What proportion of the mice are within one standard deviation away from the average weight (remember to use popsd for the population sd)?
2. What proportion of these numbers are within two standard deviations away from the list’s average?
3. What proportion of these numbers are within three standard deviations away from the list’s average?
4. Note that the numbers for the normal distribution and our weights are relatively close. Also, notice that we are indirectly comparing quantiles of the normal distribution to quantiles of the mouse weight distribution. We can actually compare all quantiles using a qqplot. Which of the following best describes the qq-plot comparing mouse weights to the normal distribution?
   * A) The points on the qq-plot fall exactly on the identity line.
   * B) The average of the mouse weights is not 0 and thus it can’t follow a normal distribution.
   * C) The mouse weights are well approximated by the normal distribution, although the larger values (right tail) are larger than predicted by the normal. This is consistent with the differences seen between question 3 and 6.
   * D) These are not random variables and thus they can’t follow a normal distribution.
5. Create the above qq-plot for the four populations: male/females on each of the two diets. What is the most likely explanation for the mouse weights being well approximated? What is the best explanation for all these being well approximated by the normal distribution?