

Applied Statistics HW 4

1. Come up with your own examples of linear transformations of variables, at least 4 examples. These should have two parts to them: What the two variables represent, and a linear equation relating them.
2. Explain what effect a linear transformation has on the shape, center and spread of a distribution. Illustrate with examples.

3. Two groups of students estimated the length of the same room. Each student on each group made an estimate. The one group was asked to estimate in meters, the other in feet. The estimates of the first group had a mean of 16 meters, and a standard deviation of 7.1446 meters. The second group's estimates had a mean of 43.7 feet, with a standard deviation of 12.5 feet.
- a. If we were to convert the first group's measurements to feet, what would be their mean and standard deviation?
 - b. Which group is estimating the room to be longer?
 - c. Which group's answers varied the most? In other words, which group was estimating less precisely?
 - d. We would like to consider the mean and standard deviation of these measurements as a good description of the length of the room and the amount of error involved. What would you need to know about the estimates the students gave before you can trust the mean and the standard deviation as good measures of center and spread?

4. As you may know, the Challenger Space Shuttle disaster was caused by the extremely low outside temperatures at the departure of the shuttle. This exercise explores this to a tiny extent. The outside temperatures for the 25 flights prior to Challenger had an average value of 70° F , with a standard deviation of 7.223° F .
 - a. European scientists wanted to compare these numbers to the temperatures in Europe, which of course are measured in Celsius. What would the average temperature and standard deviation be in Celsius?
 - b. The outside temperature on the planned day for the Challenger flight was expected to be 29° F . Compute the standardized value for this temperature, and how many standard deviations away from the mean it is. Compare that to the smallest temperature prior to that flight, which was 53° F .