

Statistical Reasoning

Normal Distribution

Name: _____ Date: _____ Class: _____

The Normal Distribution and the Standard Deviation

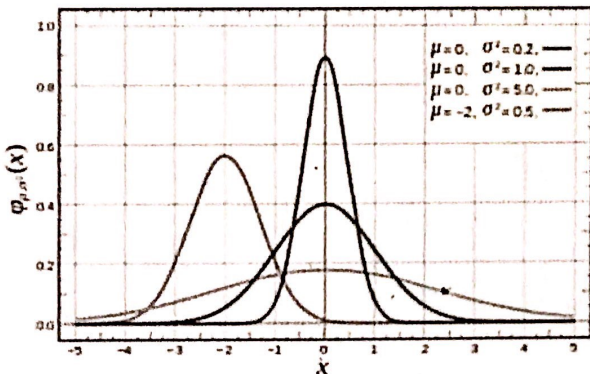
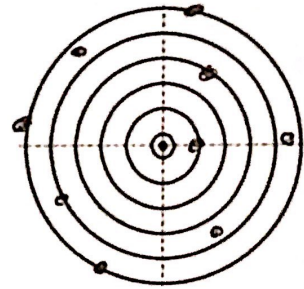
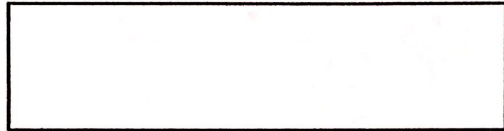
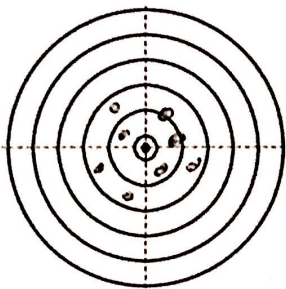
Normal Distribution: A probability distribution modeled by a bell shaped curve (also called a normal curve) that is symmetric about the mean.

The standard deviation is a measure of how far each value is from the mean.

The symbol for the population standard deviation is σ (the Greek letter sigma).

Small standard deviation

large standard deviation

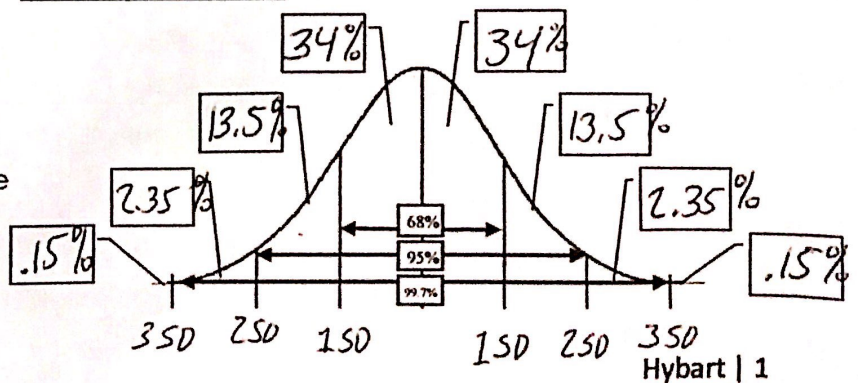


In a normal distribution, the larger the standard deviation, the "flatter" the distribution, as shown in this picture.

As the standard deviation decreases, the values in the distribution are clustered more closely around the mean, so the distribution appears "taller."

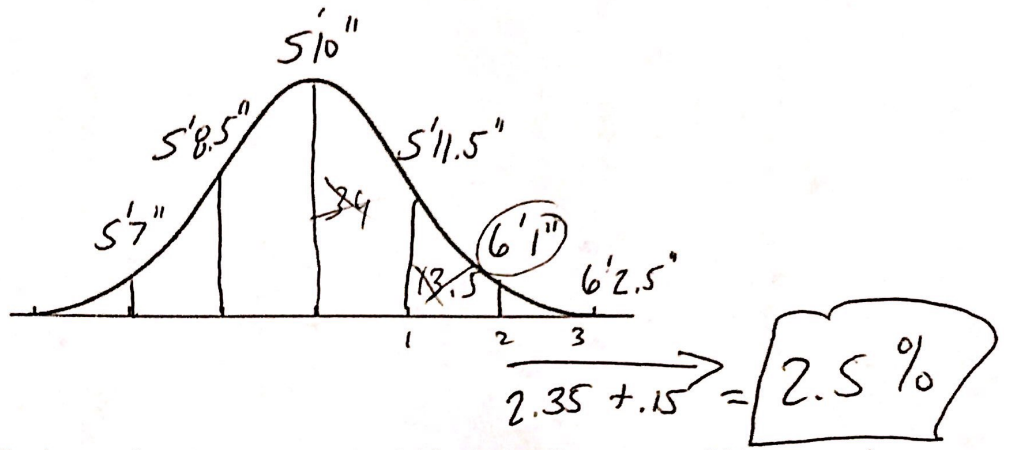
The Empirical Rule

Knowing that the values in a set are approximately normally distributed allows you to get a feel for how scarce or common a particular value might be in that set.



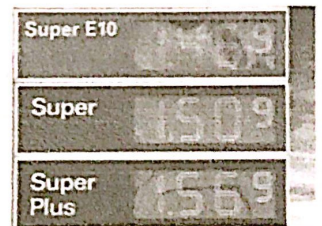
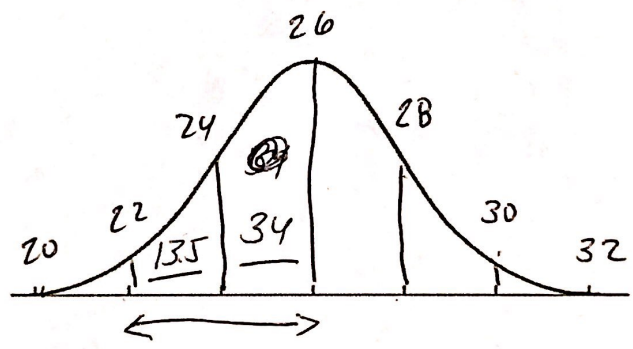
Examples

1. Human height is commonly considered an approximately normally distributed measure. If the mean height of a male adult in the U.S.A. is 5'10", with a standard deviation of 1.5", how common are men with heights greater than 6'1"?



2. If the fuel mileage of a particular model of car is normally distributed, with a mean of 26 mpg and a standard deviation of 2 mpg, how common are cars with a fuel efficiency of 22 to 26 mpg?

Handwritten calculation: $34 + 13.5 = 47.5\%$



3. If the maximum jumping height of U.S. high school high jumpers is normally distributed with a mean of 5'11" and a SD of 2", how unusual is it to see a high school jumper clear 6'3"?

