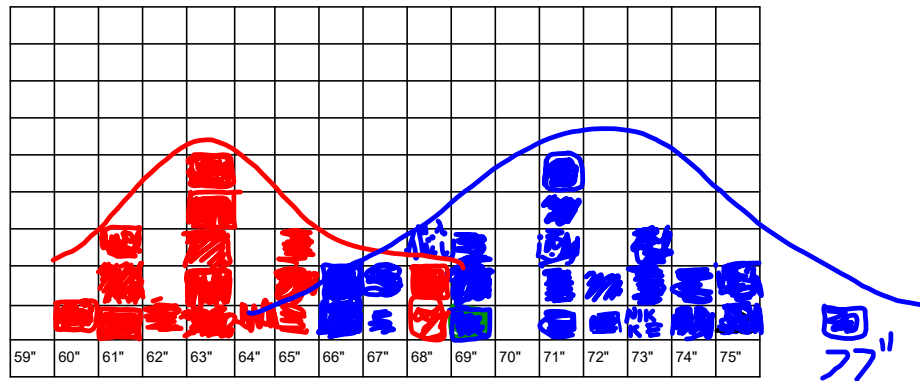


## Bellwork

Fill in a box  
for your  
height



9) experiment - yes

(as long as he uses  
enough plants)

11) Survey - no because it's a  
volunteer sample

## Homework 9-4 Solutions

1.
  - a. all eligible voters in Utah
  - b. all eligible voters in 15 state house districts
  - c. percentage of people who vote in Utah
3.
  - a. all Utahns over the age of 12
  - b. 1200 Utahns over the age of 12
  - c. the average amount of time they spend exercising
5. it is a convenience sampling and it is biased because they are conducting the survey outside of an arts program so arts supporters will be overrepresented
7. survey, if the sample size is large enough the results can be applied to the population
9. experiment, if the sample size is large enough the results can be applied to the population
11. survey, if the new customers were selected randomly then the results can be applied to all new customers
2.
  - a. teen listeners
  - b. 300 students
  - c. preferred music
4. it is a stratified sample and it is not biased as long as they pick a proportionate number of students to sample as are in each class.
6. it is a simple random sample and it is not biased because each student has an equal chance of being selected.
8. observational study, the sample cannot be applied to the population
10. observational study, the sample cannot be applied to the population

## Homework 9-5 Solutions

1. Survey; yes, it's a random sample
2. Observational Study; no observational studies cannot be applied to the population
3. Experiment; yes it's well designed experiment
4. Observational study; no, observational studies don't apply to population
5. Survey; <sup>yes</sup>~~maybe?~~ volunteer samples aren't great, but a lot returned it and it's not something people are overly passionate about
6. Experiment - no, sample size is too small

## Lesson 9.6 Objectives

I can identify types of distributions

I can calculate the percent of data that falls between certain values using means, standard deviations, and properties of normal distributions

### Important Vocabulary:

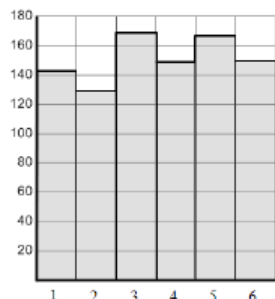
Mean: The sum of all data values divided by the number of data points  $\bar{x}$   $\mu$   
sample population

Standard Deviation: a quantity calculated to indicate the extent of deviation for a group (the bigger the standard deviation, the more spread out the data is)  $s_x$   $\sigma$   
sample population

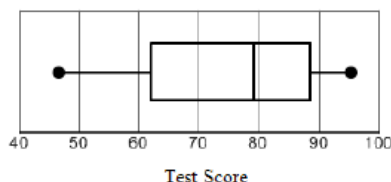
Mode: The data value that occurs the most frequently

# Types of Distributions

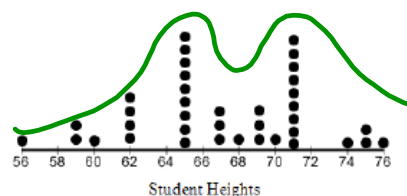
Uniform Distribution



Left Skewed



Bimodal

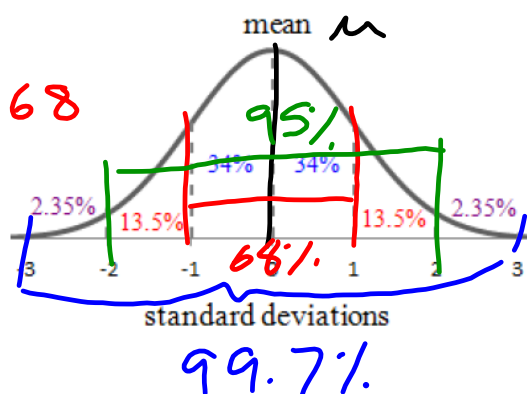


## Normal Distribution

Data that is unimodal, symmetric, and with no outliers is said to be normally distributed. A **normal distribution** is bell shaped with mean,  $\mu$ , at the center of the curve.

In a normal distribution,

- 68% of the data fall within one standard deviation,  $\pm\sigma$ , of the mean
- 95% of the data fall within two standard deviations,  $\pm 2\sigma$ , of the mean
- 99.7% of data fall within three standard deviations,  $\pm 3\sigma$ , of the mean.



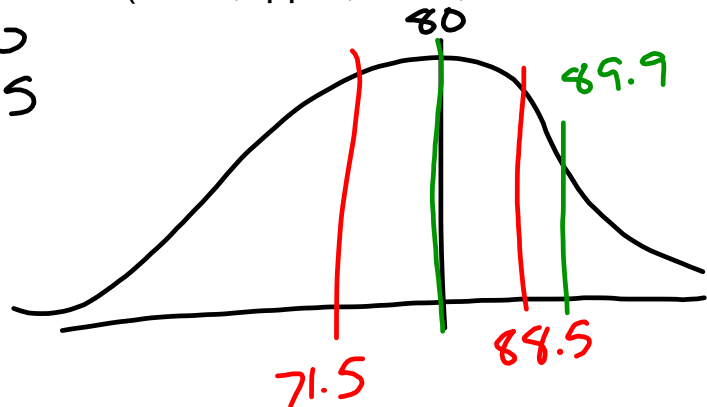
The area under a normal curve is always 1.  
When calculating population percentages, the value will be less than 1.

To find the percent of values that lie between two points, we can use the calculator

2nd → VARS(DISTR) → normalcdf(lower, upper, mean, standard deviation)

$$\mu = 80$$

$$\sigma = 8.5$$



### Example 1:

ACT test scores are approximately normally distributed. One year the scores had a mean of 21 and a standard deviation of 5.2.

- What is the interval that contains 95% of scores?  $10.6 - 31.4$
- What percentage of ACT scores is less than 25.2?  $79\%$
- What percentage of ACT scores is between 28 and 36?

$18.7\%$

