COMMON DISTRIBUTIONS

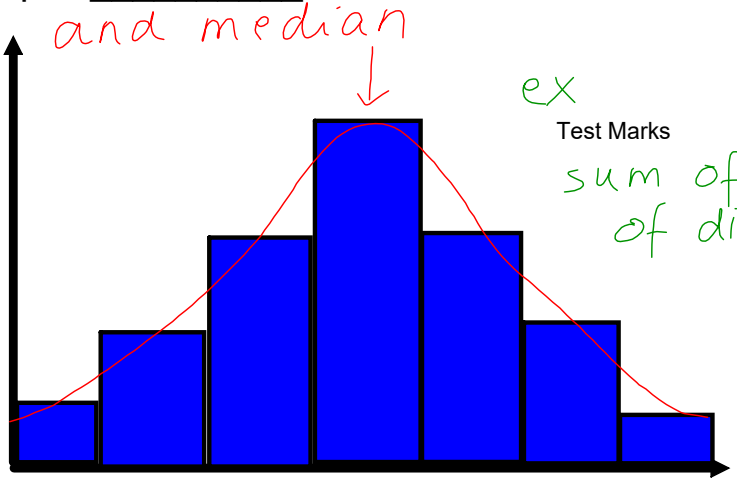
Learning Goal:

- Recognize characteristics of common distributions

Frequency tables and histograpms are examples of statistics. When data is graphed as a frequency distribution, there are several common shapes that occur.

1. Normal Distribution

- symmetrical (bell-shaped curve)
- has equal mean which are located at the centre and median



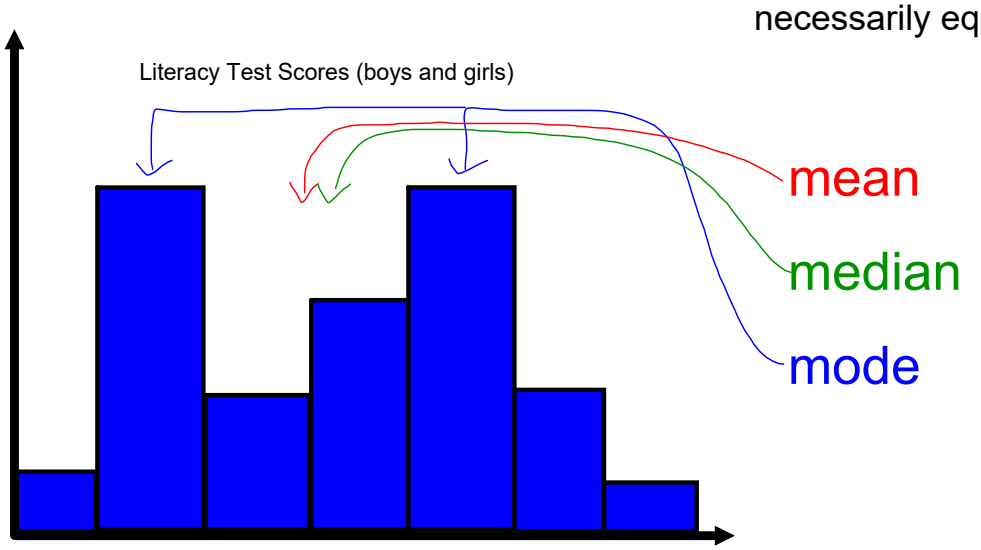
ex

Test Marks

sum of pair of dice

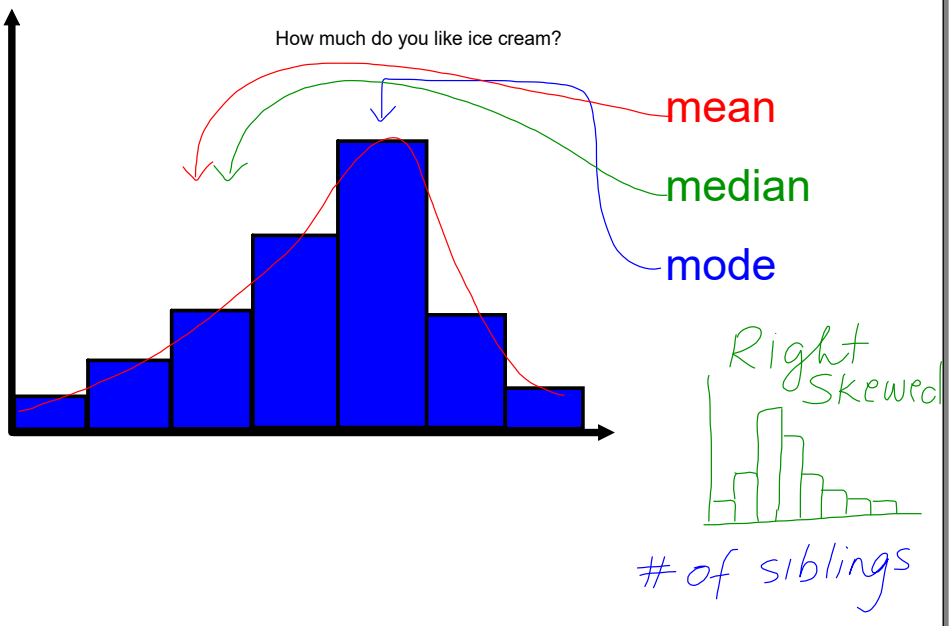
2) Bimodal Distribution

- It has 2 peaks
- If the peaks are equal, it has two modes
- The mean and the median are between the peaks, and are not necessarily equal.



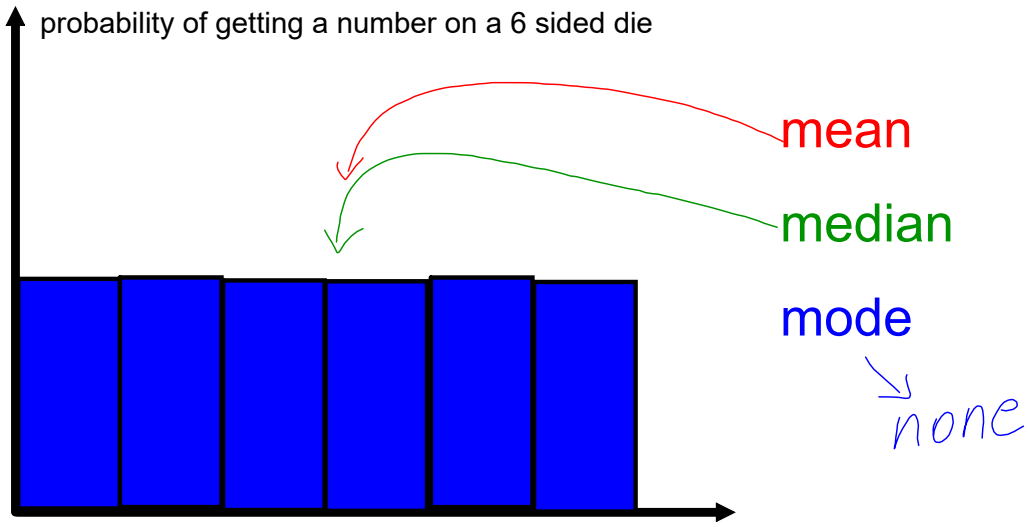
3) Skewed Distribution

- not symmetrical (more data on one side)
- the mode is at the peak
- this is an example of LEFT skewed



4) Uniform Distribution

Frequencies are the same (or very close)



Why is it important to know what kind of distribution we have?

Why do we need to know the standard deviation?

Example 1

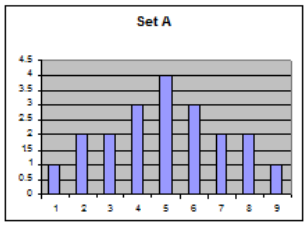
Consider the following two data sets with identical mean and median values.
Why is this information misleading?

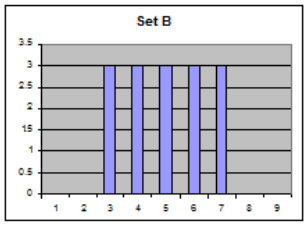
Set A: 0, 2, 2, 4, 4, 6, 6, 6, 8, 8, 8, 8, 10, 10, 10, 12, 12, 14, 14, 16

Mean = 8 Median = 8

Set B: 4, 4, 4, 6, 6, 6, 8, 8, 8, 10, 10, 10, 12, 12, 12

Mean = 8 Median = 8





What is something that can be done to further compare these graphs?
LOOK AT THE **RANGE** IN THE DATA SETS

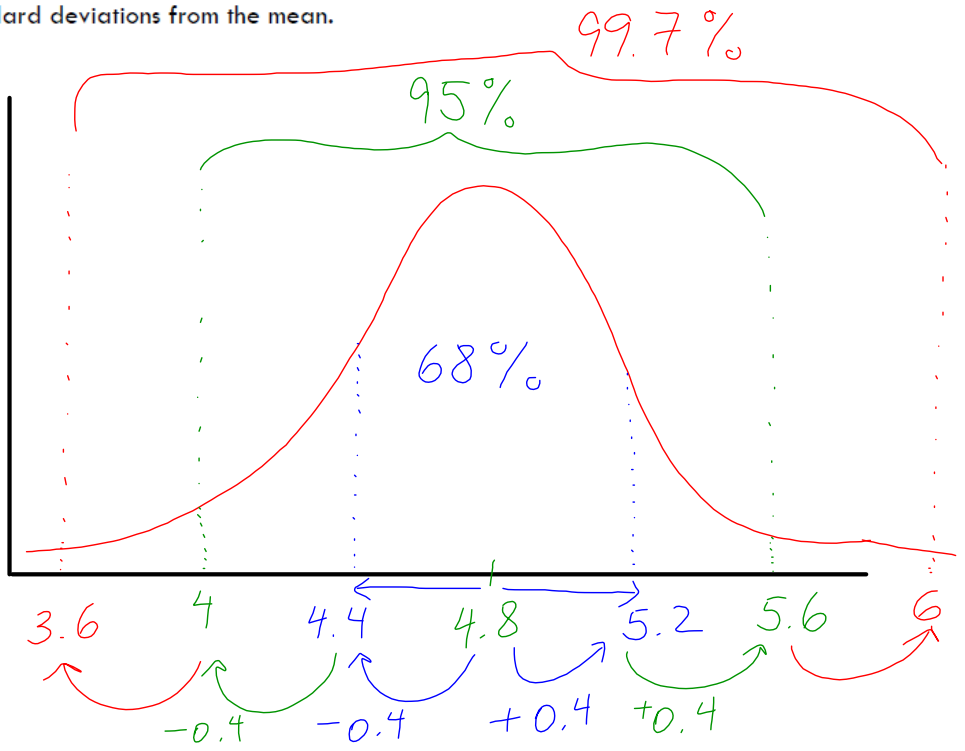
Range: is the difference between the highest and lowest numbers.

A Range = 16 − 0 = 16 B Range: = 12 − 4 = 8

lower range ∴ data is more consistent

2) The masses of gumballs are normally distributed. The mean mass is 4.8g with a standard deviation of 0.4g.

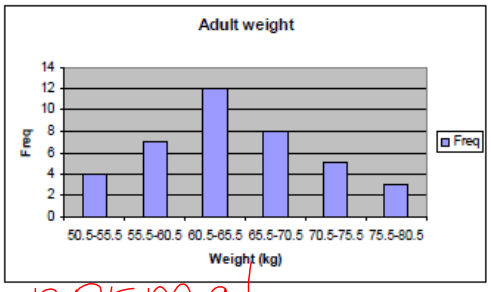
a. Sketch the shape of this distribution and mark on the location and value of masses at 1, 2 and 3 standard deviations from the mean.



On the Boards...

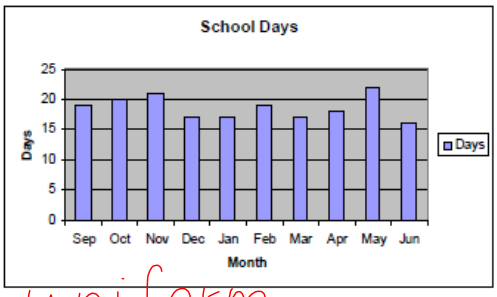
1) Label each graph as ***normal, bimodal, uniform, left-skewed*** or ***right-skewed.***

a)



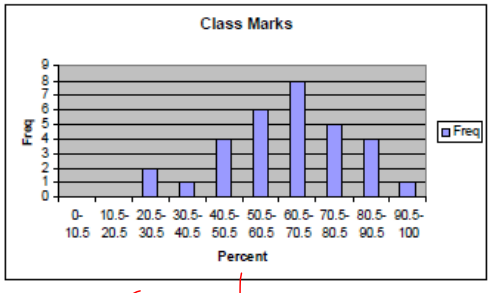
normal

b)



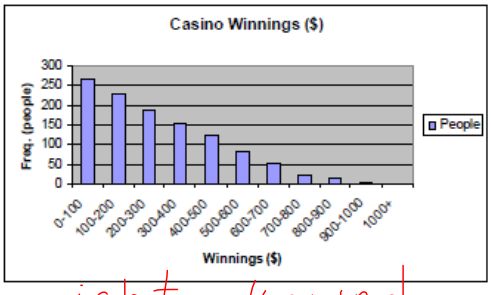
uniform

c)



normal

d)



right skewed

Use the gumball question from the notes.

b. What percent of the gumballs have a mass:

i. less than 3.6g

0.15 %

ii. greater than 3.6g

99.85 %

iii. greater than 4.4g

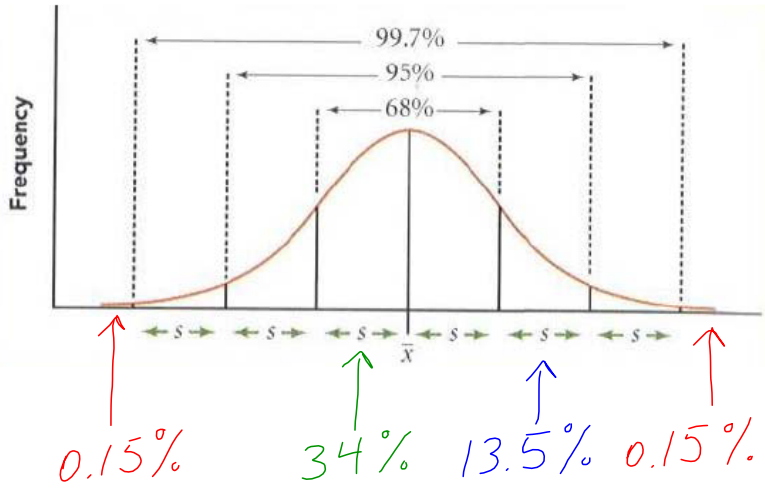
83.85 %

iv. between 3.6g and 6.0g

99.7 %

v. between 4.8g and 5.2g

34 %



3) The measurements of central tendency are given below for four data sets. In each case, identify a likely distribution for the data. Provide a rough sketch to back your answer up.

a. mean = 49.8 median = 50 mode = 50

normal

b. mean = 35 median = 40 mode = 45

left skewed

c. mean = 50 median = 51 mode = 39, 58

bimodal

d. mean = 50 median = 46 mode = 42

right skewed

Homework

pg. 153 # 1 - 7 (don't copy 'Tally' column)