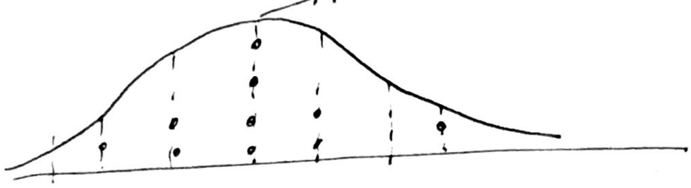
AFM Unit 2, Statistics — Name ______

Notes 2-3, Normal Distributions, Mean, S.D. — Date 2/20/20 Period 1

The Normal Distribution

When you draw a dot plot for some data sets, you get a distribution that has a particular shape. It looks like this:



This distribution shape is so common, and there are so many different data sets that produce it, that it is given a special name. It is called a Normal distribution. (You may have also heard it called a bell-shaped curve.)

When you have a data set that is normally distributed, that means that if you were to draw a dot plot of the data set, it would have this characteristic "bell" shape.

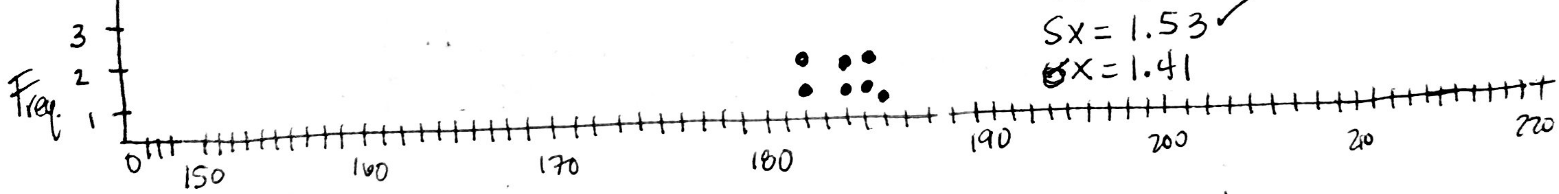
For a normally distributed data set, there are two values that we can calculate that will tell us a GREAT DEAL about the data set.

1. The value of the mean, which is a measure of Central tendency
2. The value of the standard deviation (SD), which is a measure of spread or the spread of data. (The greater the SD, the greater the spread of the data about the mean.)

Example 1: The Rubber Band Launch (P. 85-86 in Green AA text)
You want to find out how consistently rubber bands will travel when launched, so you use a ruler to launch two rubber bands seven times each. You generate the following data sets:

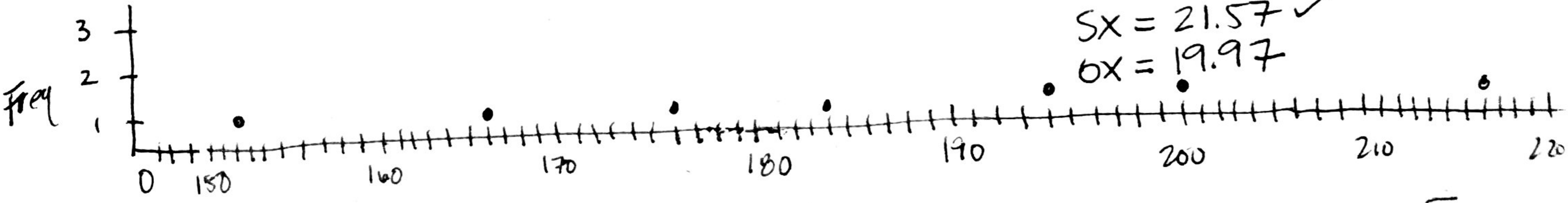
- Rubber band #1 distances (cm): {182, 186, 182, 184, 185, 184, 185}
- Rubber band #2 distances (cm): {152, 194, 166, 216, 200, 176, 184}

$\bar{x} = 184$
$Sx = 1.53$ ✓
$\sigma x = 1.41$



#1

$\bar{x} = 184$
$Sx = 21.57$ ✓
$\sigma x = 19.97$



#2

Data Point	Mean	Deviation from Mean	Squared Deviation From Mean
182 −	184	$(-2)^2$	4
186 −	184	$(2)^2$	4
182 −	184	$(-2)^2$	4
184 −	184	$(0)^2$	0
185 −	184	$(1)^2$	1
184 −	184	$(0)^2$	0
185 −	184	$(1)^2$	+ 1

14

Variance: $\dfrac{\text{squared deviation total}}{\#\text{data pts} - 1}$

↓

spread measure

$= \dfrac{14}{7-1} = \dfrac{14}{6} = 2.33 \rightarrow$ variance

Stan. dev: $\sqrt{\text{variance}} = \sqrt{2.33} = \underline{1.53}$