MBF3C – Statistics - Day 7 Handout (Measures of Spread)

Measures of Spread

In statistics there are 2 main measures of spread.
These measures allow us to determine how much our data is spread out.
They also allow us to **compare multiple data sets**.

1. Range

We have already seen this.

Steps:
The range is found by subtracting the minimum value in our data set from the maximum value.

Example: Find the mean, median, mode and range of the data set given below

65, 34, 23, 77, 23, 56, 23, 74, 37, 37, 23, 47, 23, 86, 17, 11

2. Standard Deviation (σ)

This is new!
Standard deviation is the best choice for measuring the spread in any data set.

Steps:
1. Find the difference between each value and the mean.
2. Square each difference.
3. Add up all the squared differences.
4. Divide this number by the number of entries.
5. Take the square root of this answer. (This is the standard deviation)

Example: Find the standard deviation of the data set given below

12, 18, 10, 22, 20, 17, 12, 13, 20

Mean $(\bar{x})$ = 16

$value\ (x)$	$x - \bar{x}$	$(x - \bar{x})^2$
12	12 − 16 = -4	$(-4)^2 = 16$
18	18 − 16 = 2	$(2)^2 = 4$
10	10 − 16 = -6	$(-6)^2 = 36$
22	22 − 16 = 6	$(6)^2 = 36$
20	20 − 16 = 4	$(4)^2 = 16$
17	17 − 16 = 1	$(1)^2 = 1$
12	12 − 16 = -4	$(-4)^2 = 16$
13	13 − 16 = -3	$(-3)^2 = 9$
20	20 − 16 = 4	$(4)^2 = 16$
	Total	150

Standard Deviation (σ) = $\sqrt{\dfrac{\text{Sum of squared differences}}{\text{Number of Entries}}}$

$\dfrac{150}{9} = 16.7$ $\sqrt{16.7} = 4.1$

$\boxed{\sigma = 4.1}$