

Stat 1: Measures of Central Tendency -- Mean, Median, Mode and Range

This section has information that you should have already seen a few times in your mathematical career. Mean, median, and mode are great ways to look at sets of information and compare groups of information together.

$$\Sigma = \text{"sum of"}$$

mean: average (add all #'s, divide by how many #'s are listed \rightarrow written as: \bar{x}) $n = \text{total \#s in data set}$

median: middle number when numbers are ordered from smallest to largest (average when there are 2 middle #'s) If n (# of data points) is odd $\rightarrow \frac{n+1}{2}$ (ex: $\frac{11+1}{2} = 6 \rightarrow$

mode: median is your 6^{th} #; If n is even $\rightarrow \frac{n}{2}$ (ex: $\frac{10}{2} = 5 \rightarrow$ go to # that occurs most often $5^{\text{th}} \hat{=} 6^{\text{th}}$ # - take avg.)

range: difference between the largest and smallest #'s
* write $\rightarrow \text{Max} - \text{Min} = \text{Range}$

Although these vocabulary words should be familiar, we should practice how to find each. Let's look at a couple of examples.

Example: Ms. Lingle's first period class took a test and had the following scores:

81, 97, 92, 65, 77, 89, 84, 68, 74, 93, 91, 85, 79, 84, 86, 90, 91, 84, 78, and 80.

What were the mean, median, and mode for these test scores?

- To find the mean, we add up all the numbers and divide by how many numbers there are in the set.

$$\begin{array}{l} \text{total} \rightarrow \frac{1668}{n \rightarrow 20} = 83.4 \end{array}$$

So the mean or average test score of this first period class is 83.4 %.

- To find the median, we have to list the numbers in order from smallest to largest and find the middle number. If there are two middle numbers, then you find the average of the two middle numbers by adding them together and dividing by two.

65, 68, 74, 77, 78, 79, 80, 81, 84, 84, 84, 85, 86, 89, 90, 91, 91, 92, 93, 97

$$\frac{84+84}{2} = 84$$

$$\frac{20}{2} = 10^{\text{th}}, 11^{\text{th}}$$

So the median of this first period class is 84 %.

3. To find the mode, we have to determine which number occurs the most often. If there are two numbers that occur the most, then the set is **bimodal**, or having two modes.

So the mode of this first period class is 84 %.

4. One last piece that can be compared is the range. To find the range, we take the largest number and subtract the smallest number.

$$97 - 65 = 32$$

So the range of this first period class is 32 %.

NOW YOU TRY!! Ms. Lingle's ~~first~~ ^{4th} period class took a test and had the following scores:

79, 95, 90, 63, 75, 87, 84, 66, 72, 91, 89, 85, 77, 84, 86, 88, 89, 84, 76, and 78.

$$n = 20$$

What were the mean, median, and mode for these test scores?

1. To find the mean: $\frac{1638}{20} = 81.9$

So the mean or average test score of this fourth period class is 81.9.

2. Find the median: $\frac{20}{2} = 10^{th} \& 11^{th} \rightarrow 84$

63, 66, 72, 75, 76, 77, 78, 79, 84, 84, 84, 85, 86, 87, 88, 89, 89, 90, 91, 95

So the median of this fourth period class is 84.

3. Find the mode:

So the mode of this fourth period class is 84.

4. Find the Range: $95 - 63$

So the range of this first period class is 32.

Now let's compare the information we found:

	Mean	Median	Mode	Range
1 st period	83.4	84	84	32
4 th period	81.9	84	84	32

Do you see anything interesting? Write a sentence about what you notice.

The mean for 1st period was higher, but all of the other data was the same. The max & min in 1st per. was 97 & 65, max & min in 4th per. 95 and 63 accounted for difference in the mean.

Notes

Alg. II
Stat & Prob.
Notes
3-20-14

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Algebra II - Notes - Statistics & Prob.

2nd → mem (above + sign)

Ram → clear (will reset everything)
reset

"Stat" button

Edit - show L1, L2, L3

Enter each # from data

make sure highlight is on last #
entered - bottom - L1 ()
↑
n

Go to "Stat"

Sort A → enter

2nd 1(L1) → enter

STAT - enter

Frequency Tables: Show you how many times the data appears.

89, 92, ~~88~~, 78, ~~89~~, 90, 92, ~~89~~

n = 8

Put
in
numerical
order

Data	Frequency
78	1
88	1
89	3
90	1
92	2

78 · 1 = 78
 88 · 1 = 88
 89 · 3 = 267
 90 · 1 = 90
 92 · 2 = 184

$$\bar{X} = \frac{707}{8} = 88.375$$

707

$$\frac{8}{2} = 4^{th} \text{ \& } 5^{th} \# = 89$$

med. 89
 mode 89
 range = 92 - 78 = 14

Practice:

Temps during February	Frequency	
37	1	= 37
43	1	= 43
44	1	= 44
46	3	= 138
47	3	= 141
49	1	= 49
51	5	= 255
52	2	= 104
54	1	= 54
56	3	= 168
		1033

$\bar{X} = \frac{1033}{21} = 49.19$
 $\text{med} = \frac{21+1}{2} = \frac{22}{2} = 11^{\text{th}}$
 51
 $\text{mode} = 51$
 $\text{Range} = 19$

Temps during January	Frequency	
40	1	= 40
42	3	= 126
43	1	= 43
44	3	= 132
45	3	= 135
47	4	= 188
48	4	= 192
49	3	= 147
50	2	= 100
53	1	= 53
		1156

$\bar{X} = \frac{1156}{25} = 46.24$
 $\text{med} = \frac{25+1}{2} = \frac{26}{2} = 13^{\text{th}} = 47$
 $\text{mode} = 47, 48$
 $\text{Range} = 53 - 40 = 13$

Avg. temperature in January is lower than in February - There were more 47° and 48° days in January - In Feb. - more 51° temp. Feb. had a larger Range of Temps.

(2)

Notes

Algt II
Stat. & Prob.
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Shortcut for finding mean, median,
mode:

"Stat" → "calc" → enter

(1-Var. Stats) → enter ↓

$$\begin{array}{l} \bar{x} = 83.4 \\ \text{sum} \Rightarrow \sum X = 1668 \\ n = 20 \\ \text{min } X = 65 \\ \text{med.} = 84 \\ \text{max } X = 97 \end{array} \quad \left. \vphantom{\begin{array}{l} \bar{x} = 83.4 \\ \sum X = 1668 \\ n = 20 \\ \text{min } X = 65 \\ \text{med.} = 84 \\ \text{max } X = 97 \end{array}} \right\} \frac{1668}{20} = 83.4 = \bar{x}$$

