

Finding Line of Best Fit using Desmos

- 1.) Click the "+" in the upper left corner and select table.
- 2.) Enter table of values in 1st "box"
Click the magnifying glass beneath the table to zoom in.
- 3.) Enter $y_1 \sim mx_1 + b$
*to enter subscript, click the keyboard in the bottom left corner, click ABC, and then a_b *

Measures of Central Tendency

BASIC DEFINITIONS	
Mean	average of all values; sum/total # of values
Median	middle value; when ordered least to greatest
Mode(s)	the value that reoccurs most often
Lower Extreme	minimum; smallest value
Upper Extreme	maximum; largest value
Lower Quartile	Q ₁ , the median of the lower half of values
Upper Quartile	Q ₃ , the median of the upper half of values
Range	largest value minus smallest value
Interquartile Range	Q ₃ - Q ₁

Standard Deviation - a measure used to determine how varied (spread out) the values are.

Mean Absolute Deviation - average distance between each data value and the mean

Example: Given the data set ~~{4, 10, 10, 14, 4, 25, 15, 22, 10, 10}~~, find each value.

~~4, 4, 10, 10, 10, 14, 15, 16, 22, 25~~
~~X, X, X, X, ↓, X, X, X, X~~
 Mean: $\frac{130}{10} = 13$ $\frac{10+14}{2}$ Lower Extreme: 4
 Upper Extreme: 25
 Median: 12 Range: 21
 Lower Quartile: 10
 Upper Quartile: 16
 Mode: 10 Interquartile Range: 6

$4, 4, \boxed{10}, 10, 10, 14, 15, \boxed{16}, 22, 25$
 lower half \downarrow 12 upper half
 Q1 Q3

**When to use
what
measure:**

Mean: Use the mean to describe the middle of a set of data that does not have an outlier!

Median: Use the median to describe the middle of a set of data that does have an outlier.

Mode: Use the mode when the data are nonnumeric or when choosing the most popular item.

Statistics on the Graphing Calculator

*The graphing calculator is a powerful tool when it comes to measuring statistics.
It can perform many of the calculating that we currently do by hand.*

Exercise #1: Shown below are the scores 16 students received on a math quiz.

74, 98, 60, 72, 80, 91, 52, 73, 72, 66, 92, 68, 75, 66, 84, 82

Step #1: Go to **STAT, EDIT**, Enter the values into **L₁**

L1	L2	L3	T
75			
80			
82			
84			
91			
92			
98			

L1(16) = 98

Step #2: Go to **STAT**, arrow over to **CALC**, and choose **1: 1-Var Statistics**

```
EDIT [2nd] [MODE] TESTS
1: 1-Var Stats
2: 2-Var Stats
3: Med-Med
4: LinReg(ax+b)
5: QuadReg
6: CubicReg
7: QuartReg
```

Step #3: Hit ENTER twice. You are given a screen that gives information pertaining to your data set.

\bar{x} =	mean	=	75.31
Σx =	sum of all values	=	1205
n =	total number of values	=	16
minX =	minimum	=	52
Q_1 =	lower quartile	=	67
Med =	median	=	73.5
Q_3 =	upper quartile	=	83
MaxX =	maximum	=	98

```

1-Var Stats
x̄=75.3125
Mx=1205
Sx=92.967
sx=12.15301746
σx=11.76710856
↓n=16
    
```

σ_x = standard deviation
= 11.77

The calculator will NOT give you mode and range. You must find these by hand.

Range = 46
mode = 72, 66
IQR = 16

Exercise #2: Biologists are studying the weight of Albacore tuna caught off the coast of Washington State. A sample of tuna is taken and their weights, in pounds, are given below:

36, 22, 41, 18, 36, 27, 31, 38, 25, 29, 22, 34, 48, 20, 12, 19, 35, 32, 41, 50

(a) Which is the greater measure of center?

Mean or median?

$$\bar{x} = 30.8$$

$$\text{med} = 31.5$$

(b) What is the range of this data set?

$$50 - 12 = 38$$

Exercise #3: Dr. Wittgenstein is researching the time it takes for people to fall asleep at night. In his lab, he records the time it takes each of his subjects to fall asleep, in minutes, and compiles the data set shown below.

22, 8, 19, 14, 25, 95, 32, 7, 14, 20, 18, 10, 22, 17, 27, 16

(a) Find the mean and median amount time that it takes subjects to fall asleep.

$$\bar{x} = 22.88$$
$$\text{med} = 18.5$$

(b) Are there any outliers in this data set? If so, which value?

95

(c) Determine the mean and median of this data set if this outlier is removed.

$$\bar{x} = 18.07$$
$$\text{med} = 18$$

(d) Did the outlier make a significant difference in the mean and median?