9D

LIST, >>Math, 5 sum
2nd STAT,

Complete rows 3-6 of the table below. Put row 2 in a list to make things go faster.

																Sum
	1. Original Data	9	11	14	12	11	10	10	6	10	15	13	11	9	12	10	
L2	2. Sorted	6	9	9	10	10	10	10	11	11	11	12	12	13	14	15	
	3. Median				10				$\boxed{11}$				12				
L2−11 ⇒ L3	4. Deviation: (2.) -median	-5	-2	-2	-1	-1	-1	-1	0	0	0	1	1	2	3	4	-2
sum(L2)/15	5. Mean ($\bar{x}$)								10.86								
L2−$\bar{x}$ ⇒ L4	6. Deviation: (2.) - mean	-4.9	-1.9	-1.9	-.9	-.9	-.9	-.9	0.1	0.1	0.1	1.1	1.1	2.1	3.1	4.1	sum(L2-$\bar{x}$) 0
	7. | Deviation |	4.9	1.9	1.9	0.9	.9	0.9	0.9	0.1	0.1	0.1	1.1	1.1	2.1	3.1	4.1	24.13
	8. (Deviation)^2	23.7	3.5	3.5	.75	.75	.75	.75	.18	.18	.18	1.28	1.28	4.55	9.82	17.1	

The median balances the data by count.

data points on left = # data points on right

The mean balances the data by value.

distances from $\bar{x}$ on left = distances from $\bar{x}$ on right

Which is more susceptible to outliers? mean Which is more susceptible to skewed data? Mean

The measure of center seeks to do the impossible, describe the entire data set with one number.

Since Statistics is about variation, we need a measure of spread to complement the measure of center.

Last class we decided the IQR was the best measure of spread to complement the median because it wasn't susceptible to outliers. Now we need a measure of spread to complement the mean.

Explain why we can't just use the sum of the deviations (row 6) to find an average deviation and propose a solution.

The sum of the deviations from the mean = 0. Average would be 0 always. A solution would be to take the absolute value so "−" & "+" don't cancel.

In row 7 write | (2.) - mean | and use the sum (24.13) to find the average deviation = 1.608. (math>>CPX, 5 abs((sum(abs(L2 − $\bar{x}$)))÷15

Now calculate the average deviation from (mean +0.1, -0.1, -1.0) with: (sum(abs(L2-X)))/15
10.96, 10.76, 9.86
1.602, 1.615, 1.746 Comment on your findings:
+0.5: 1.72 | -0.5: 1.642 | -1.0: 1.746

The average deviation changes w/ different $\bar{x}$ values. Avg. for ($\bar{x}$ + 0.1) was < avg for $\bar{x}$

Another way we could overcome the sum of line 6 problem would be to square the deviations.

In row 8 write ((2.) - mean)^2 [(L2 − 10.86)^2 ⇒ L6] and use the sum [67.73] to find the average squared deviation = 4.515. This is called the variance and the problem of using it as measure of spread to complement to the mean is:

The units are the square of the original data.

so we need to take the square root to obtain the standard deviation = 2.125

Now calculate the standard deviation from (mean +0.1, -0.1, -1.0) with: √ (sum((L2-X)^2)/15)
10.96, 10.76, 9.86
2.127, 2.127, 2.349 Comment on your findings:

The standard deviation changes w/ different $\bar{x}$ values. Standard deviation using $\bar{x}$ was smallest.