4-2 Range and Standard Deviation

Mean, median, and mode help describe the center of the data.
Look at one student's test scores: 40, 50, 60, 70, 70, 70, 80, 90, 100.
Compare to another student's scores: 70, 70, 70, 70, 70, 70, 70, 70, 70, 70.
The mean, median, and mode are the same, but just by looking it can be seen the data sets are very different.
Range and standard deviation tell how spread out the data is. In the first list, the student scores are spread out. While the scores in second list are all the same.

The range is found by subtracting the smallest from the largest number in the list. The range in the first set of student scores is 100-40=60 the range for the second set is 0.

Standard deviation is another way to see the spread of numbers. It is a measure of how close the data is to the mean. It is more tedious to figure, but working in a table helps.

1) First find the mean of the list. In the first set above the mean is 70.
2) Subtract the mean from each number in the list and square the answer.

Data	Mean Subtracted	Answer squared
40	40-70=-30	900
50	50-70=-20	400
60	60-70=-10	100
70	70-70=0	0
70	0	0
70	0	0
80	80-70=10	100
90	90-70=20	400
100	100-70=30	900

3) Add the squares. 900+400+100+0+0+0+100+400+900=2800
4) There are 9 numbers in the list. Divide by nine minus one. 2800)(9-1)=2800)8=350
5) Take the square root of the answer. $\sqrt{350}$ =18.7

18.7 is the standard deviation of the first set of student scores. The larger the standard deviation the more spread out the data.

Practice: Find the mean, median, mode, range and standard deviation each data set.

a) Class grades:	75, 78, 90, 89, 87, 56, 98, 100, 49, 72
b) Income/month:	500, 800, 300, 700, 250, 900, 1100, 500, 600, 700,
c) Stock gains:	.04, -.3, .3, .25, -.1, .09
d) Lengths of machine part:	1 ½, 1 ¾, 1 $^{5}/_{8}$, 1 $^{4}/_{8}$, 1 $^{2}/_{3}$
e) Length of time on our internet sight in minutes:	3 $^{7}/_{8}$, 4 ¾, 2 $^{15}/_{16}$, 3
f) Hours sleep per night:	8, 7, 6, 8, 6, 6, 7
g) Sales per hour in dollars:	9000, 5000, 4500, 4500, 7000, 6500, 5900, 5800, 6500, 9500
h) Weight of puppies in lbs.:	3, 4, 2, 5, 3, 6, 4, 6, 4, 3