Algebra 2 – Standard Deviation & Z-scores Name _____

Measures of variation – How spread out the values are.

Range – the spread for all the data

Range = High – Low

Interquartile Range (IQR) – the spread of the middle 50% of the data

IQR = $Q_3 - Q_1$

Example: There are nine members of the Community Youth League

Their ages are: 22, 16, 24, 14, 16, 25, 20, 19, 26

Range =

IQR =

Standard Deviation – Measures how each value in a data set varies (deviates) from the mean.

$$\sigma = \sqrt{\frac{\Sigma(x-\bar{x})^2}{n}}$$

	$x - 23$	$(x-23)^2$
x	$x - \bar{x}$	$(x-\bar{x})^2$
20	-3	9
22	-1	1
22	-1	1
23	0	0
28	5	25
		36

$$\bar{x} = \frac{20 + 22 + 22 + 23 + 28}{5} = 23$$

1. Find the mean: $\bar{x}$ (round if you need to)
2. Find the difference between each value and the mean $x - \bar{x}$
3. Square each difference
4. Find the average of the squares
5. Take the square root to find the standard deviation

$\frac{36}{5} = 7.2$

$\sigma = \sqrt{7.2} = 2.7$

Example: Find the deviation of the data set of ages: 41, 45, 53, 50

x	$x - \bar{x}$	$(x - \bar{x})^2$

How many of the ages are within one standard deviation of the mean?

How many of the ages are within two standard deviations of the mean?

Finding the Standard Deviation of the players weights using a calculator:

2014-2015 Detroit Pistons

NO.	NAME	POS	AGE	HT	WT	COLLEGE	2014-2015 SALARY
14	D.J. Augustin	PG	26	6-0	183	Texas	$3,000,000
1	Chauncey Billups	SG	37	6-3	210	Colorado	$2,500,000
2	Caron Butler	SF	34	6-7	228	Connecticut	$4,500,000
12	Will Bynum	PG	31	6-0	185	Georgia Tech	$2,915,908
5	Kentavious Caldwell-Pope	SG	21	6-5	205	Georgia	$2,772,480
13	Luigi Datome	SF	26	6-8	215		$1,750,000
25	Spencer Dinwiddie	PG	21	6-6	200	Colorado	$700,000
0	Andre Drummond	C	21	6-10	270	Connecticut	$2,568,360
33	Aaron Gray	C	29	7-0	270	Pittsburgh	$1,227,985
7	Brandon Jennings	PG	24	6-1	169		$8,000,000
33	Jonas Jerebko	PF	27	6-10	231		$4,500,000
20	Cartier Martin	PF	29	6-7	220	Kansas State	$1,145,685
20	Jodie Meeks	SG	27	6-4	208	Kentucky	$6,000,000
9	Tony Mitchell	PF	22	6-8	235	North Texas	$816,482
10	Greg Monroe	PF	24	6-11	250	Georgetown	$5,479,933
25	Kyle Singler	SF	26	6-8	230	Duke	$1,090,000
6	Josh Smith	SF	28	6-9	225		$13,500,000
31	Charlie Villanueva	PF	30	6-11	232	Connecticut	$8,580,000

Directions

1. Enter the weights of the Detroit Piston players into your calculator (use L1)
2. Find the 1-VAR STAT for L1
3. The standard deviation is the symbol: σx
   (Sx is another standard deviation)

The standard deviation of the Detroit Piston player weights is ≈

The mean weight of the Detroit Pistons players is $\bar{x}$ ≈

How many of the players are within one standard deviation of the mean?

How many of the players are within two standard deviations of the mean?

Finding a *Z*-score for a number in a data set

Z is how many standard deviations a value is from the mean

Z-scores can be positive or negative or 0

$$Z = \frac{value\ -\ mean}{standard\ deviation} \qquad Z = \frac{x - \bar{x}}{\sigma}$$

Find the *Z*-score for Andre Drummond

Find the *Z*-score for Brandon Jennings