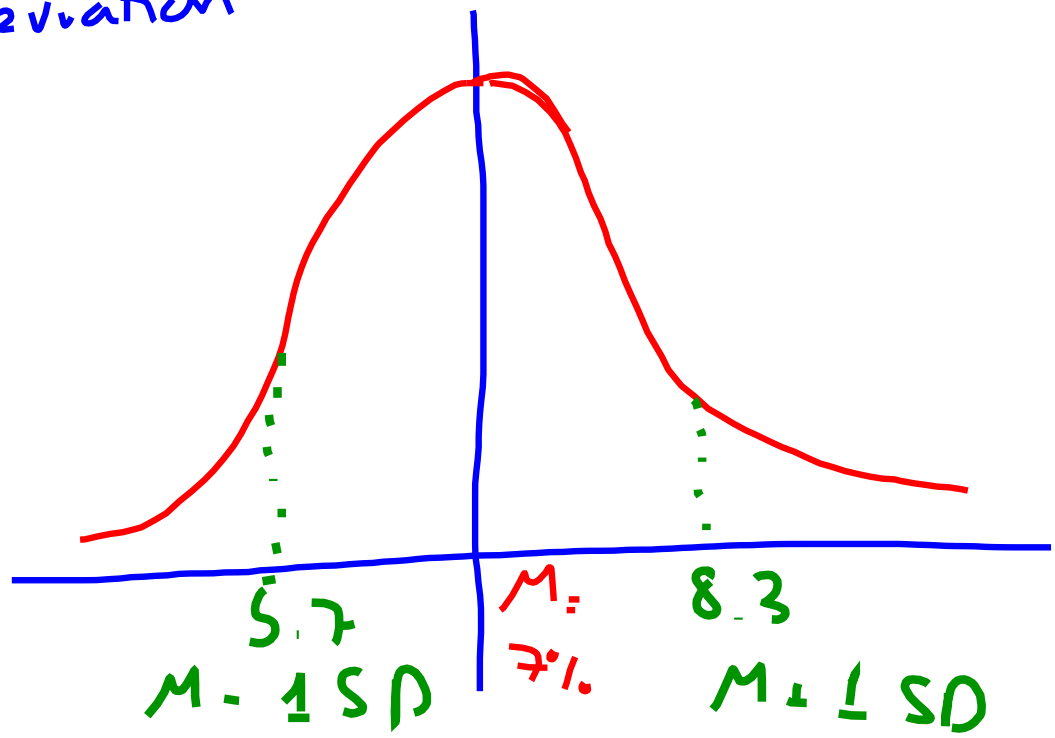
11.3. Measures of Dispersion.

Goal. Calculate the range and Standard Deviation of data sets

Standard Deviation



E.g. Heights (in inches) of top 5 players from 2 basket-ball teams

A: 72, 73, 76, 76, 78

B: 67, 72, 76, 76, 84

Range of A: 78 - 72 = 6 inches

Range of B: 84 - 67 = 17 inches

Standard Deviation of A

x	$x - \bar{x}$	$(x - \bar{x})^2$
72	−3	9
73	−2	4
76	1	1
76	1	1
78	3	9
		24

$$\text{Mean } \bar{x} = \frac{72 + 73 + 76 + 76 + 78}{5}$$

$$= 75$$

Sample Variance

$$\frac{24}{5 - 1} = \frac{24}{4} = 6$$

Standard deviation:

$$\sqrt{6} = 2.4494$$

Ex. Calculate SD. of B

67, 72, 76, 76, 84

S.D. ≈ 6.25

Standard Deviation for grouped data.

Interval	Midpoint (x)	Frequency (f)	$x \cdot f$
1.5 - 4.5	3	3	9
4.5 - 7.5	6	4	24
7.5 - 10.5	9	7	63
10.5 - 13.5	12	2	24
		16	120

$\bar{x} = \frac{120}{16} = 7.5$

$(x-\bar{x})^2 \cdot f$			
$(3-7.5)^2 \cdot 3$			
$(6-7.5)^2 \cdot 4$			
$(9-7.5)^2 \cdot 7$			
$(17-7.5)^2 \cdot 2$			
1	126	$\boxed{\frac{126}{3}} = 42$	$\sqrt{42} \approx 6.48$
		Sample Variance	Standard deviation