

MEASURES OF CENTRAL TENDENCY + VARIATION

Measures of central tendency

$$\text{Mean} = \frac{\text{sum of data}}{\# \text{ of items}}$$

$$= \frac{\sum x}{n}$$

population	sample
μ	\bar{x}

Median

the middle value

1) Put data in order!

20 items

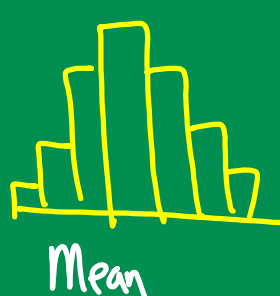
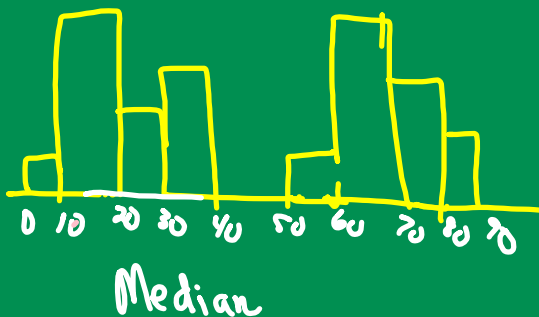
$$\frac{20}{2} = 10^{\text{th}} + 11^{\text{th}}$$

$$\frac{85}{2} = 42.5 \approx 43^{\text{rd}}$$

Mode

the most frequent value

HISTOGRAM



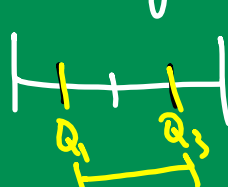
MEASURES OF VARIATION - show the "spread" of the data

Range = Highest value - Lowest value

$$98 - 78 = 20$$

Interquartile Range (IQR)

$$18 - 46 = 52$$



$$= Q_3 - Q_1$$

= finds range of middle 50% of data.

Standard Deviation - the "average" of how much each piece of data varies from the mean.

{7, 13, 16, 17, 19, 24}

1) Find mean

2) Data - Mean

3) Square the differences

4) Find mean of squares

$$\bar{x} = \frac{96}{6} = 16$$

$$7 - 16$$

$$-9^2 \quad -3^2 \quad 0^2 \quad 1^2 \quad 3^2 \quad 8^2$$

$$= 81 + 9 + 0 + 1 + 9 + 64 = \frac{164}{6} = \sqrt{27.33} = 5.23$$

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n - 1}}$$

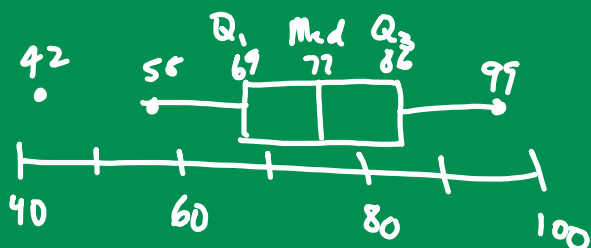
$$\sigma = \sqrt{\frac{\sum (x - \mu)^2}{n}}$$

Chemistry Test

4	.	2					
5	.	8					
6	.	1	4	8	9		
7	.	2	4	4	5	6	8 9
8	.	2	2	2	6	8	
9	.	1	4	8	9		

22 students

$$4 \div 2 = 42$$



$$\text{Median} = \frac{22}{2} = 11^{\text{th}} + 12^{\text{th}}$$

$$\frac{76 + 78}{2} = 77$$

$$\text{Quartiles: } \frac{11}{2} = 5.5 \approx 6^{\text{th}}$$

$$Q_1 = 69$$

$$Q_3 = 86$$

$$\text{IQR} = 86 - 69 = 17$$

Outliers

$$1) \text{ IQR} \times 1.5 = \#$$

$$17 \times 1.5 = 25.5$$

$$2) \text{ Lower boundary}$$

$$Q_1 - \# = 69 - 25.5 = \underline{43.5}$$

$$3) \text{ Upper boundary}$$

$$Q_3 + \#$$

$$86 + 25.5 = \underline{111.5}$$