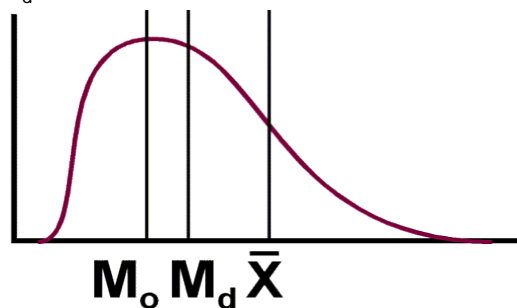


Lab #5: Central Tendency & Variability Key

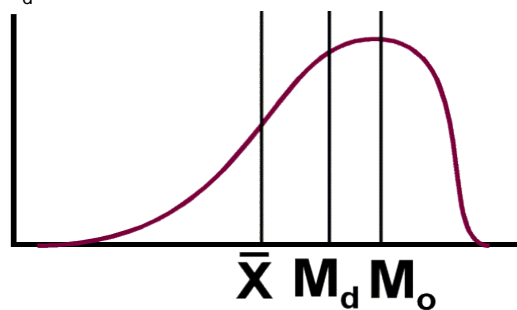
- 1) Mean is the arithmetic average. Sum of the scores divided by the number of them.
Median is the score that divides the distribution in half. Has 50% above & below.
Mode is the score that occurs most often.
Range indicates the distance from the lowest score to the highest score.
Mean Deviation is the sum of the absolute value of deviations of the scores from their mean divided by the number of them.
Sums of Squares is the sum of the squared deviations about the mean.
Variance is the mean of the squared deviations about the mean.
Standard Deviation is the square root of variance.

2) a. the mean

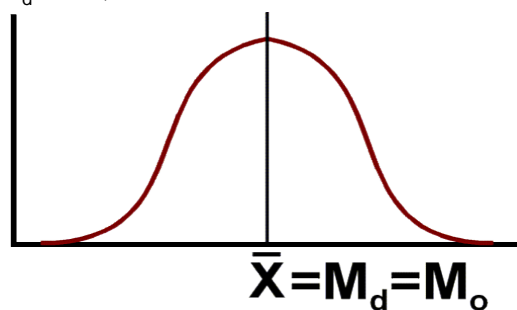
b. If $\bar{X} - M_d > 0$, then +skew



If $\bar{X} - M_d < 0$, then -skew



If $\bar{X} - M_d = 0$, then it is a normal distribution.



c. All 3 measures of central tendency coincide.

3) a.

X	\bar{X}	$ X - \bar{X} $	$(X - \bar{X})^2$	X^2
1	5.2	4.20	17.64	1
2	5.2	3.20	10.24	4
4	5.2	1.20	1.44	16
5	5.2	0.20	0.04	25
5	5.2	0.20	0.04	25
6	5.2	0.80	0.64	36
6	5.2	0.80	0.64	36
6	5.2	0.80	0.64	36
8	5.2	2.80	7.84	64
9	5.2	3.80	14.44	81
$\Sigma X=52$		$\Sigma=18.00$	$\Sigma=53.60$	$\Sigma=324$
$N=10$				

$$\bar{X} = \frac{\sum X}{N} = \frac{52}{10} = 5.2$$

M_d = the score of 5.5 has 50% falling below it.

Mode = 6

$$R = X_H - X_L + 1 = 9 - 1 + 1 = 9$$

$$MD = \frac{\sum |X - \bar{X}|}{N} = \frac{18}{10} = 1.8$$

V & SD with defining formulas:

$$s^2 = \frac{\sum (X - \bar{X})^2}{N - 1} = \frac{53.60}{10 - 1} = \frac{53.60}{9} = 5.956$$

$$s = \sqrt{s^2} = \sqrt{5.956} = 2.440$$

V & SD with computational formulas:

$$s^2 = \frac{N \sum X^2 - (\sum X)^2}{N(N - 1)}$$

$$s^2 = \frac{10 \times 324 - (52)^2}{10(10 - 1)}$$

$$s^2 = \frac{3240 - 2704}{10(9)} = \frac{536}{90} = 5.956$$

$$s = \sqrt{s^2} = \sqrt{5.956} = 2.440$$

3) b.

X	\bar{X}	$ X - \bar{X} $	$(X - \bar{X})^2$	X^2
4	8.5	4.50	20.25	16
6	8.5	2.50	6.25	36
6	8.5	2.50	6.25	36
7	8.5	1.50	2.25	49
8	8.5	0.50	0.25	64
9	8.5	0.50	0.25	81
10	8.5	1.50	2.25	100
11	8.5	2.50	6.25	121
12	8.5	3.50	12.25	144
12	8.5	3.50	12.25	144
$\Sigma X=85$		$\Sigma=23.00$	$\Sigma=68.50$	$\Sigma=791$
$N=10$				

$$\bar{X} = \frac{\sum X}{N} = \frac{85}{10} = 8.5$$

M_d = the score of 8.5 has 50% falling below it.

Mode = 6 & 12

$$R = X_H - X_L + 1 = 12 - 4 + 1 = 9$$

$$MD = \frac{\sum |X - \bar{X}|}{N} = \frac{23}{10} = 2.3$$

V & SD with defining formulas:

$$s^2 = \frac{\sum (X - \bar{X})^2}{N - 1} = \frac{68.50}{10 - 1} = \frac{68.50}{9} = 7.611$$

$$s = \sqrt{s^2} = \sqrt{7.611} = 2.759$$

V & SD with computational formulas:

$$s^2 = \frac{N \sum X^2 - (\sum X)^2}{N(N - 1)}$$

$$s^2 = \frac{10 \times 791 - (85)^2}{10(10 - 1)}$$

$$s^2 = \frac{7910 - 7225}{10(9)} = \frac{685}{90} = 7.611$$

$$s = \sqrt{s^2} = \sqrt{7.611} = 2.759$$