S12 - 3.1 - Statistics Mean Notes

Parameters (Pop ;N) or Statistics (Sample ; n-1)

μ or $\bar{x}$ = mean (**Average**)

Data: 2,4,5,6,8

n : # *of data**

Mean "Mhew"

$$\mu = \frac{x_1 + x_2 + x_3 + \cdots + x_n}{n}$$

$$\mu = \frac{2+4+5+6+8}{5} = \frac{25}{5} = 5$$

$$\textbf{Mean} = \frac{\text{All Numbers Added}}{\text{Number of Numbers}}$$

Median: *Middle number* = 5

Range: *Top# − Bottom#* = 8 − 2 = 6

Mode: *Most occurring number*. No Mode

Data: 3, 3, 5, 7

$$Median = \frac{3+5}{2} = \frac{8}{2} = 4$$

Mode = 3

Data	x	$x-\mu$	$(x-\mu)^2$
1)	2	−3	9
2)	4	−1	1
3)	5	0	0
4)	6	1	1
5)	8	3	9
Sum	25		20

$$\sigma_s = \sqrt{\frac{\text{sum of the squares of the differences from the mean}}{\text{number of values} - 1}}$$

$\sigma_s = s$

$$\sigma_s = \sqrt{\frac{(x_1-\mu)^2 + (x_2-\mu)^2 + \cdots + (x_n-\mu)^2}{n-1}}$$

variance : σ^2

$$\sigma_s = \sqrt{\frac{(2-5)^2 + (4-5)^2 + (5-5)^2 + (6-5)^2 + (8-5)^2}{5-1}}$$

$$\sigma_s = \sqrt{\frac{(-3)^2 + (-1)^2 + (0)^2 + (1)^2 + (3)^2}{5-1}}$$

$$\sigma_s = \sqrt{\frac{9+1+0+1+9}{5-1}} = \sqrt{\frac{20}{4}} = \sqrt{5} = 2.24$$

Notice it's a coincidence the mean and median are the same for simplicity in the math.

$$\sigma_p = \sqrt{\frac{\sum(x_i-\mu)^2}{n}}$$

$\sum$: Sum

$$\sigma_p = \sqrt{\frac{20}{5}} = \sqrt{4} = 2$$

Population (Parameters)

$$\sigma_s = \sqrt{\frac{\sum(x_i-\mu)^2}{n-1}}$$

$$\sigma_s = \sqrt{\frac{20}{4}} = \sqrt{5} = 2.24$$

Sample (Statistics)

Bigger to account for bias in a small sample

Ti-84 Calculator Instructions:

[STAT] [EDIT] [ENTER]
Enter Data L1*

Mean/Stdev — TI-83: 1-Var Stats L1,L2*

[STAT] [CALC] [1-Var Stats] [ENTER]
List: L1* (Freq See Below)
[ENTER] [ENTER] [ENTER*]

Clear Data
[DEL] Cell
Clear Column
(Don't Press DEL) **Don't**
[UP] [CLEAR] [ENTER] [DOWN]
L1 L2 L3 ...
If you do
[2nd] [Ins] L#* (so as above)

$\bar{x}$ = *mean*	$\bar{x}$ = 5
$\sum x$ = *sum data*	$\sum x$ = 25
$\sum x^2$ = *sum data squared*	$\sum x^2$ = 145
sx = *stdev population*	sx = 2.24
σx = *stdev sample*	σx = 2
n = # *of data**	n = 5
minX = min data	*minX* = 2
Q_1 = *1st quartile 25%* <	Q_1 = 3
Med = *median*	*Med* = 5
Q_3 = *3rd quartile 75%* <	Q_3 = 7
maxX = max data	*maxX* = 8

Casio fx260

[Enter Data] [Mode] [0] [Mode] [.] [2] [M+] Repeat last two buttons for all data [Shift] [4 - 9]

Frequency Distribution

Data	x	freq $f(x)$	$x \times f(x)$
1)	2	1	2
2)	4	4	16
3)	5	2	10
4)	6	3	18
5)	8	1	8
Sum		11	44

Frequency: L2* FreqList: L2*

Frequency - number of occurrences of data

$$\mu = \frac{x_1 + x_2 + x_3 + \cdots + x_n}{n}$$

$$P_E(2) = \frac{1}{11}$$

$$\mu = \frac{\sum xf(x)}{n}$$

$$\mu = \frac{2+4+4+4+4+5+5+6+6+6+8}{11}$$

Median = 5

$$\mu = \frac{44}{11} = 4$$

$$\mu = \frac{44}{11} = 4$$

S12 - 3.2 - Statistics Frequency MeanNotes

Frequency Distribution

$Data$	x	$freq\ f(x)$	$x \times f(x)$
1)	2	1	2
2)	4	4	16
3)	5	2	10
4)	6	3	18
5)	8	1	8
Sum		11	44

Frequency: L2* FreqList: L2*

Frequency - number of occurrences of data

$$\mu = \frac{x_1 + x_2 + x_3 + \cdots + x_n}{n}$$

$$P_E(2) = \frac{1}{11}$$

$$\mu = \frac{\sum x f(x)}{n}$$

$$\mu = \frac{2+4+4+4+4+5+5+6+6+6+8}{11}$$

$Median = 5$

$$\mu = \frac{44}{11} = 4$$

$$\mu = \frac{44}{11} = 4$$

$$\sigma_s = \sqrt{\frac{sum\ of\ the\ squares\ of\ the\ differences\ from\ the\ mean}{number\ of\ values - 1}}$$

$$\sigma_s = \sqrt{\frac{f(x_1-\mu)^2 + f(x_2-\mu)^2 + \cdots + f(x_n-\mu)^2}{n-1}}$$

$$\sigma_s = \sqrt{\frac{1(2-5)^2 + 4(4-5)^2 + 2(5-5)^2 + 3(6-5)^2 + 1(8-5)^2}{11-1}}$$

$$\sigma_s = \sqrt{\frac{1(-3)^2 + 4(-1)^2 + 2(0)^2 + 3(1)^2 + 1(3)^2}{11-1}}$$

$$\sigma_s = \sqrt{\frac{1(9) + 4(1) + 2(0) + 3(1) + 1(9)}{11-1}} = \sqrt{\frac{25}{10}} = \sqrt{2.5} = 1.58$$