

Statistics
Summer 2022
Lecture 3



TI Instructions:

- 1) To clear the Screen: **Clear**
- 2) To quit: **2nd Mode**
- 3) To clear all lists: **2nd + 4:clear all lists Enter**
- 4) To reset all lists: **STAT Edit Enter**
5:Set up Editor

How to find \bar{x} and S using TI-83 or TI-84:

with Menu **2nd** **1**

STAT **→** **CALC**
1: 1-Var Stats

List: L1
 FreqList: **clear**
Calculate
 No Menu
 1-Var Stats L1
Enter

$\bar{x} = 10.7$
 $S_x = S = 4.762$
 $n = 10$

How to find S^2 :
VARS **5: Statistics** **3: Sx** **x^2** **Enter** $S^2 = 22.67$

Let's convert to a reduced fraction:
MATH **1: Frac** **Enter** $S^2 = \frac{2041}{90}$

Clear all lists: **2nd** **+** **4: Clear All Lists** **Enter**
 Reset all lists: **STAT** **Edit**
5: Setup Editor **Enter**
 Clear the Screen! **clear**

I randomly Selected 20 students and here are their ages:

25	32	18	40	35	Clear all lists
20	16	24	35	25	2nd + 4: Clear all lists
39	29	42	31	26	Enter
25	35	40	19	28	Reset all lists

Let's store this Sample in L1 **STAT** **Edit**
5: Setup Editor **Enter**

STAT Edit	L1
1: Edit	25 Enter
	32 Enter
	⋮
	28 Enter

Let's quit **2nd** **MODE**
 Clear the Screen **clear**

Sort L1, then view L1, and make Stem Plot

[STAT] Edit [2nd] [1] [Enter]
 2: SortAC

[2nd] [1] [Enter]

{ 16 18 19 ... }
 ↓ ↓ ↓ → → →

1	6 8 9
2	0 4 5 5 5 6 8 9
3	1 2 5 5 9
4	0 0 2

Find \bar{x} and S

[STAT] → CALC
 1: 1-Var Stats

$\bar{x} = 29.2$

$S = 7.898$

$n = 20$

↓
 ↓
 ↓
 ↓

Min = 16
 Q1 = 24.5
 Med. = 28.5
 Q3 = 35
 Max = 42

With Menu:

List: L1

Freq List: Clear

Calculate

No Menu

1-Var Stats L1

[Enter]

5-Number
 Summary

find S^2 in reduced fraction

Exact answer

VARs 5: Statistics 3: S_x χ^2 Enter

$$S^2 = 62.3789\dots$$

MATH 1: ▸ Frac Enter

$$S^2 = \frac{5926}{95} \checkmark$$

Consider the chart below

class MP	class F
18	4
30	6
42	10
54	5

1) How many classes?

4

2) Sample Size

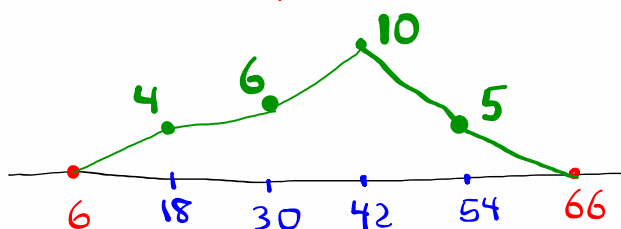
$$n = \sum f = 4 + 6 + 10 + 5 = 25$$

3) class width

$$CW = 30 - 18 = 42 - 30 = 54 - 42$$

= 12

4) Draw Freq. Polygon



How to find \bar{x} and S of a grouped data:

Clear all lists: `2nd` `+` `4:clear all lists` `Enter`

Reset all lists: `STAT` `Edit` `5:Set up editor` `Enter`

Store class MP in L1
class F in L2

`STAT` `Edit` `1:Edit`

L1	L2
18	4
30	6
42	10
54	5

$\bar{x} = 37.68$
 $S = 11.940$
 $n = 25$

Find S^2 in reduced fraction

`MARS` `5:Statistics` `3:Σx2` `MATH` `1:Frac` `Enter`

With Menu: `2nd` `1` `2nd` `2` `Calculate`

No Menu
`1-Var Stats`
`L1` `L2` `Enter` `7` `Enter`

$S^2 = \frac{3564}{25}$

Complete the chart below

class MP	class F	Cum. F	Rel. F	% F
10	3	3	.075	7.5%
20	8	11	.200	20%
30	9	20	.225	22.5%
40	14	34	.350	35%
50	6	40	.150	15%

5 classes
 CW = 10
 5 classes
 $n = 40$
 $Rel. F = \frac{F}{40}$

Histogram

- Class MP
- Rel. F.

Find \bar{x} & S for this grouped data:

Clear all lists: `2nd` `+` `ti` `:` `Enter`

Class	MP	F
	→ L1	→ L2
	10	3
	20	8
	30	9
	40	14
	50	6

$\bar{x} = 33$
 $S = 11.810$
 $n = 40$

Find S^2 in reduced fraction.

`NARS`
`5: Statistics`
`3: Sx`
 `\bar{x}^2`
`MATH`
`1: \blacktriangleright Frc`
`Enter`

`STAT` `→` `Calc`
`1:1-Var Stats`
 with Menu
 List: L1
 FreqList: L2
`Calculate`
 No Menu
 1-Var Stats
 L1, L2 `Enter`
`□`

$S^2 = \frac{5440}{39}$

I randomly Selected 30 exams, and here are their Scores.

75	88	90	58	100
70	80	92	98	65
72	83	94	59	100
68	77	88	99	55
70	82	93	64	80
84	88	91	81	79

Store in L1
 Sort L1
 View L1
 Make Stem Plot

5	589
6	4 58
7	002579
8	001234888
9	0123489
10	00

Find \bar{x} & s

STAT → **CALC**

L1

1:1-Var Stats

$\bar{x} = 80.76$

$s = 12.990$

$n = 30$

$\left. \begin{array}{l} \text{Min} = 55 \\ \text{Q}_1 = 70 \\ \text{Med.} = 81.5 \\ \text{Q}_3 = 91 \\ \text{Max} = 100 \end{array} \right\} \text{5-Number Summary}$

Find S^2 in reduced fraction

VARs

5: Statistics

3: Sx

x²

MATH

1: → frac

Enter

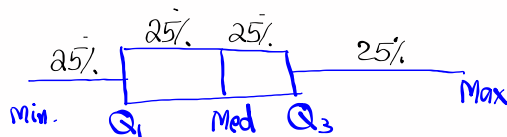
$S^2 = \frac{146801}{870}$

5-Number Summary:

Min Q₁ Med. Q₃ Max

↑ First Quartile ↑ Third Quartile

Box Plot

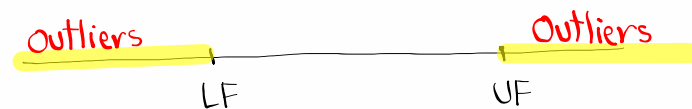


$IQR = Q_3 - Q_1$

↑ Inter-Quartile - Range

Upper fence = $Q_3 + 1.5(IQR)$

Lower fence = $Q_1 - 1.5(IQR)$

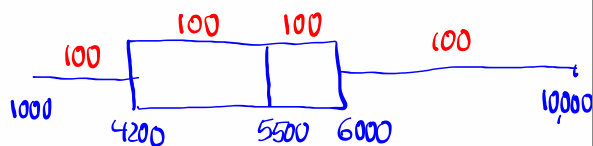


I randomly selected 400 nurses. 5-Number Summary of their Salaries are

1000, 4200, 5500, 6000, 10000

Min Q₁ Med. Q₃ Max

Box Plot



$$\text{IQR} = Q_3 - Q_1 = 6000 - 4200 = 1800$$

$$\text{Upper Fence} = Q_3 + 1.5(\text{IQR}) = 6000 + 1.5(1800) = \boxed{8700}$$

$$\text{Lower Fence} = Q_1 - 1.5(\text{IQR}) = 4200 - 1.5(1800) = \boxed{1500}$$



Empirical Rule:

when data dist. is symmetric (Mean = Mode = Med.)

About 68% fall within $\bar{x} \pm S$

About 95% " " $\bar{x} \pm 2S$ Usual Range

About 99.7% " " $\bar{x} \pm 3S$

Ex: Exam 1 Scores had a symmetric dist with $\bar{x} = 82$ and $S = 8$.

$$68\% \text{ Range} = \bar{x} \pm S = 82 \pm 8 \Rightarrow \boxed{74 \text{ to } 90}$$

$$95\% \text{ Range} = \bar{x} \pm 2S = 82 \pm 2(8) \Rightarrow \boxed{66 \text{ to } 98}$$

$$99.7\% \text{ " } = \bar{x} \pm 3S = 82 \pm 3(8) \Rightarrow \boxed{58 \text{ to } 106}$$

Class QZ 1:

Consider the Sample below:

8 12 10 10 7
15 13 20 18 12

Find

1) $\bar{x} = 12.5$

2) $s = 4.2$

3) $s^2 = \frac{313}{18}$

} 1-decimal

} Reduced
Fraction