Statistics

Fall 2022

Lecture 5

Feb 19-8:47 AM

Class QZ 4

Given: $n=10$, $\Sigma x=53$, $\Sigma x^2=327$

Find

1) $\bar{x}=5.3$ ✓

2) $s=2.3$ ✓

} Round to 1-decimal

3) $s^2=\frac{461}{90}$ ✓ } Reduced fraction.

$\bar{x}=\frac{\Sigma x}{n}=\frac{53}{10}=5.3$ ✓

$s^2=\frac{n\Sigma x^2-(\Sigma x)^2}{n(n-1)}=\frac{10\cdot 327-53^2}{10(10-1)}=\frac{461}{90}$

$s=\sqrt{s^2}=\sqrt{\frac{461}{90}}=2.263$

Oct 27-8:18 AM

Consider the Sample below

2, 4, 4, 4, 5, 5, 5, 11

1) $n = 8$

2) Range: $11 - 2 = 9$

3) Midrange: $\frac{11+2}{2} = \frac{13}{2} = 6.5$

4) Mode = 4 & 5

5) $\Sigma x = 2 + 4 + 4 + 4 + 5 + 5 + 5 + 11 = 40$

6) $\Sigma x^2 = 2^2 + 4^2 + 4^2 + 4^2 + 5^2 + 5^2 + 5^2 + 11^2 = 248$

7) $\bar{x} = \frac{\Sigma x}{n} = \frac{40}{8} = 5$

8) $s^2 = \frac{n\Sigma x^2 - (\Sigma x)^2}{n(n-1)} = \frac{8 \cdot 248 - 40^2}{8(8-1)}$

$= \frac{384}{56} = \frac{192}{28} = \frac{96}{14} = \boxed{\frac{48}{7}}$

9) Find $s = \sqrt{s^2} = \sqrt{\frac{48}{7}} = \boxed{2.619}$

10) Estimate $s \approx \frac{\text{Range}}{4} = \frac{9}{4} = \boxed{2.25}$

Oct 31-6:02 AM

TI Instructions:

1) To reset all lists. [STAT] Edit [5:SetUpEditor] [Enter]

2) To clear all lists. [2nd] [+] [4:Clear all lists] [Enter]

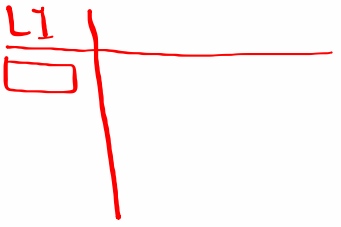
3) To quit. [2nd] [MODE]

4) To clear the Screen. [Clear]

Oct 31-6:12 AM

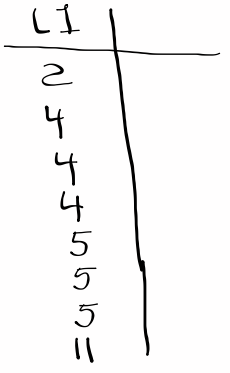
How to store data elements:

STAT Edit
1:Edit



2 enter 4 enter 4 enter 4 enter 5 enter

5 enter 5 enter 11 enter



quit 2nd MODE

Clear the Screen clear

Oct 31-6:17 AM

How to view L1:

2nd 1 Enter

L1

{ 2 4 4 4 5 . . . 11 }

quit 2nd MODE

Clear the Screen clear

Oct 31-6:21 AM

How to perform basic computations in Statistics:

STAT → CALC

1: 1-Var Stats

With Menu

List: L1

Freqlist: clear L1 Enter

Calculate

No Menu

1-Var Stats

2nd 1

$\bar{x} = 5$

$\sum x = 40$

$\sum x^2 = 248$

$S_x = 2.619$

$n = 8$

How to find S^2:

VARS 5: Statistics 3: S_x x^2 Enter

$S^2 = 6.857$

How to convert to a reduced fraction:

MATH 1: ▶Frac Enter

$S^2 = \frac{48}{7}$

Oct 31-6:26 AM

Clear all lists. 2nd + 4: clear All Lists Enter

Clear the Screen Clear

Store the following sample in a list.

15 10 8 20 25

12 18 10 29 19

STAT Edit

1: Edit

L1
15
10
8
20
⋮
19

quit 2nd MODE

Clear the Screen clear

Oct 31-6:35 AM

Let's view L1:

2nd 1 Enter

{15 10 8 20 25 ... 19}

How to Sort a list:

STAT Edit

2: SortA(2nd 1 Enter

L1

Now let's view L1 again

2nd 1 Enter

{8 10 10 12 ...

Oct 31-6:41 AM

Find

$\bar{x} = 16.6$

$S_x = 6.899$

$n = 10$

$\Sigma x = 166$

$\Sigma x^2 = 3184$

STAT → CALC

1: 1-Var Stats

With Menu:

List: L1

FreqList: Clear

Calculate

2nd 1

No Menu:

1-Var Stats L1 Enter

Find S^2 in reduced fraction:

VARS 5: Statistics 3: S_x x^2 Enter $S^2 = 47.6$

MATH 1: ▶Frac Enter $S^2 = \frac{238}{5}$

Clear All lists 2nd + 4: ClrAllLists Enter

Clear the Screen clear

Oct 31-6:49 AM

I randomly selected 20 students, and here are their ages:

25	32	18	40	20
19	30	24	25	42
24	25	32	35	45
50	20	48	39	40

Store this data in L1

Double check, then Sort L1.

STAT Edit
1:Edit

L1

STAT Edit
2:SortA(L1 Enter
2nd 1

Now view L1, and make STEM Plot

2nd 1 Enter

{18 19 20 20 → → → 50}

1	89
2	00 14 55 5
3	02 25 9
4	00 25 8
5	0

Oct 31-7:12 AM

Find

$\bar{x} = 31.5$

$\Sigma x = 630$

$\Sigma x^2 = 21864$

$S_x = 10.308$

$n = 20$

$\min = 18$

$Q_1 = 22.5$

$\text{Med.} = 31$

$Q_3 = 40$

$\max = 50$

5-Number Summary

STAT → CALC
1:1-Var STAT

2nd 1

With Menu: List: L1
FreqList: clear
Calculate

No Menu: 1-Var Stats L1 Enter

Find S^2 in reduced fraction.

VARS 5:Statistics 3:S_x χ^2 Math 1:▶Frac Enter

$S^2 = \frac{2019}{19}$

$\square\frac{\square}{\square}$ $\frac{\square}{\square}$

Oct 31-7:25 AM

Min = 18

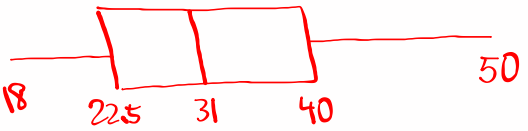
$Q_1 = 22.5$

Med. = 31

$Q_3 = 40$

Max = 50

Draw Box Plot



$IQR = Q_3 - Q_1 = 40 - 22.5 = \boxed{17.5}$

Upper Fence $= Q_3 + 1.5(IQR) = 40 + 1.5(17.5) = \boxed{66.25}$

Lower Fence $= Q_1 - 1.5(IQR) = 22.5 - 1.5(17.5) = \boxed{-3.75}$

Outliers: None

Oct 31-7:39 AM

Complete the chart below

class limits	class MP	class F	cum. F
18 - 28	23	5	5
29 - 39	34	12	17
40 - 50	45	20	37
51 - 61	56	3	40

1) How many classes? 4

2) Sample Size $n = 40$

3) class width $\boxed{11}$

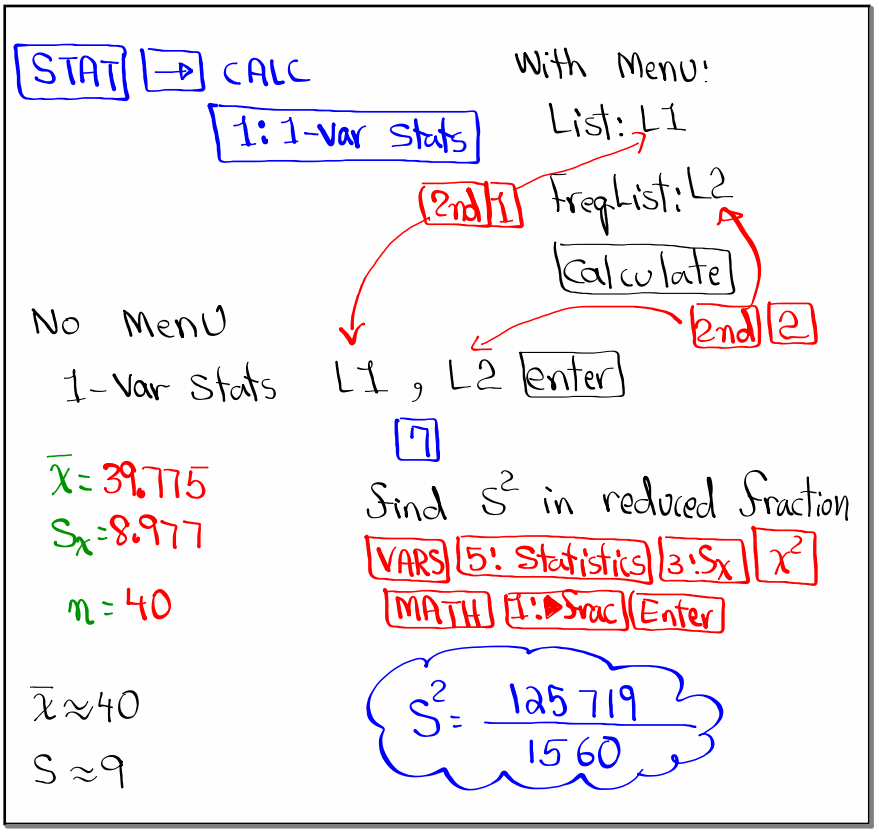
Clear all lists

Class MP $\rightarrow$ L1

Class F $\rightarrow$ L2

L1	L2
23	5
34	12
45	20
56	3

Oct 31-7:46 AM



Oct 31-7:56 AM

$\bar{x} \approx 40$ using empirical rule:

$S \approx 9$

68% Range = $\bar{x} \pm S = 40 \pm 9 \Rightarrow$ 31 to 49

Usual Range = $\bar{x} \pm 2S = 40 \pm 2(9) \Rightarrow$ 22 to 58

"95% Range"

Oct 31-8:04 AM

Clear all lists.

L1	L2
55	3
65	7
75	15
85	20
95	5

STAT → CALC

1: 1-Var Stats

With Menu:

List: L1

FreqList: L2

Calculate

No Menu:

1-Var Stats L1, L2

enter

$\bar{x} = 78.4$

$S_x = 10.422$

$n = 50$

Find S^2 in reduced fraction.

$S^2 = \frac{5322}{49}$

Oct 31-8:07 AM

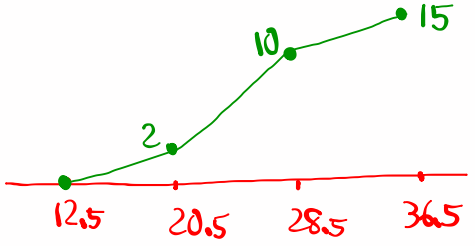
Class QZ 5

Consider the chart below

class BNDRS	class F	Cum. F
12.5 - 20.5	2	2
20.5 - 28.5	8	10
28.5 - 36.5	5	15

Draw ogive

"clearly label"



Oct 31-8:14 AM