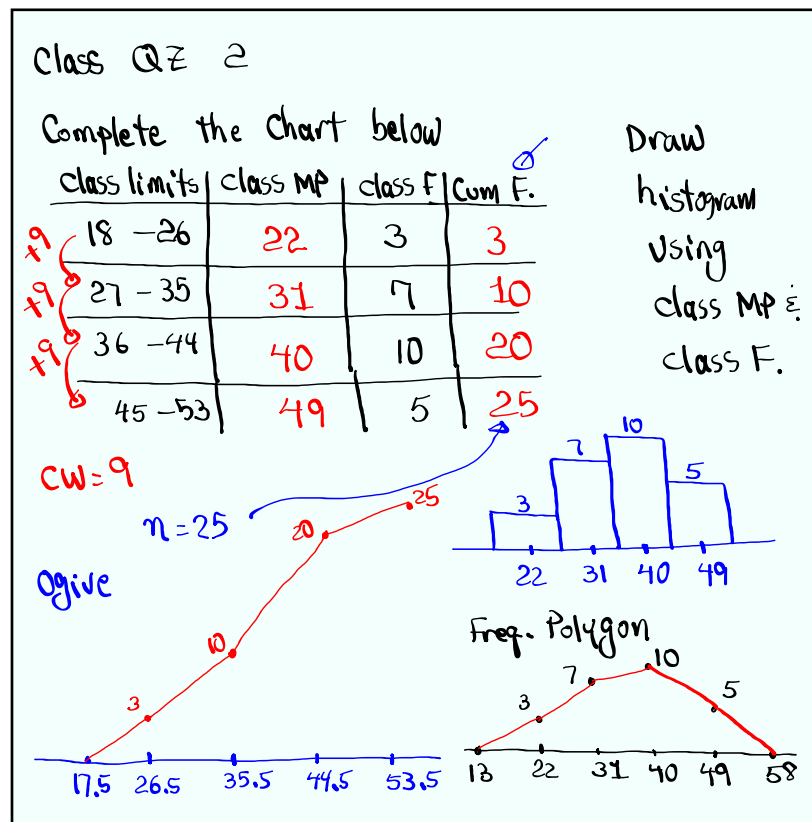


Statistics

Lecture 4



Feb 19-8:47 AM



Sep 13-10:46 AM

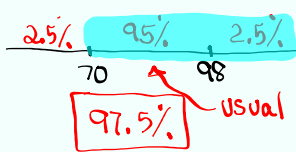
A sample of 150 exam scores had a $\bar{x} = 84$ and $S = 7$.

use empirical rule to find

1) 68% Range
 $\bar{x} \pm S = 84 \pm 7$
 $\Rightarrow 77 \text{ to } 91$

2) Usual Range
 95% Range
 $\bar{x} \pm 2S = 84 \pm 2(7)$
 $= 84 \pm 14 \Rightarrow \boxed{70 \text{ to } 98}$

3) 99.7% Range
 $\bar{x} \pm 3S = 84 \pm 3(7)$
 $= 84 \pm 21$
 $\Rightarrow \boxed{63 \text{ to } 105}$

4) what% of these exams are above 70?


5) How many Score were unusually high?
 $2.5\% (150) = .025 (150) = 3.75 \approx \boxed{4}$

Sep 20-8:13 AM

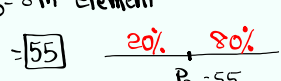
Consider the Stem Plot below

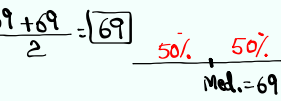
4	2358
5	0245578
6	23588899
7	034556689
8	256899
9	02


1) $n = 36$

2) Range = $92 - 42 = 50$

3) Estimate $S \approx \frac{\text{Range}}{4}$
 $S \approx \frac{50}{4} = \boxed{12.5}$

4) P_{20}
 $L = \frac{20}{100} \cdot 36 = 7.2 \quad L = 8$
 $P_{20} = 8^{\text{th}} \text{ element} = \boxed{55}$


5) Median = P_{50}
 $L = \frac{50}{100} \cdot 36 = 18$
 $P_{50} = \frac{18^{\text{th}} \text{ element} + \text{Next element}}{2}$
 $= \frac{69 + 69}{2} = \boxed{69}$


6) Find k such that
 $P_k = 74$ *Below*
 $k = \frac{B}{n} \cdot 100 = \frac{21}{36} \cdot 100 = 58.\bar{3} \approx 58$


Sep 20-8:21 AM

Z-Score

1) Always round to 3-decimal places

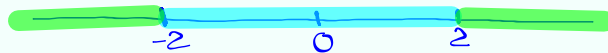
$$2) Z = \frac{x - \bar{x}}{S}$$

It tells us how many standard deviations is the data element above or below the mean

It helps us standardize data elements and compare them from different samples

If $-2 \leq Z \leq 2$, data element is usual.

If $Z < -2$ or $Z > 2$, data element is unusual.



Sep 20-8:34 AM

Lisa got 90 on exam 1. $\bar{x} = 84$; $S = 8$

1) what is here Z-Score?

$$Z = \frac{x - \bar{x}}{S} = \frac{90 - 84}{8} = \frac{6}{8} = \boxed{.75}$$

2) Is Lisa's score usual or unusual? explain

Since $-2 \leq Z \leq 2$, then it is usual.

Sep 20-8:40 AM

Maria makes \$6600/mo. as a nurse.

John makes \$5750/mo. as a manager.

Nurse: $\bar{x} = 6000$, $S = 250$

Managers: $\bar{x} = 5000$, $S = 200$

$$\text{Maria: } Z = \frac{x - \bar{x}}{S} = \frac{6600 - 6000}{250} = \frac{600}{250} = 2.4$$

$$\text{John: } Z = \frac{x - \bar{x}}{S} = \frac{5750 - 5000}{200} = \frac{750}{200} = 3.75$$

John is doing much better

There was a nurse with Z-Score of -1.5.

What was the Salary? $Z = \frac{x - \bar{x}}{S}$

$$-1.5 = \frac{x - 6000}{250}$$

Cross-Multiply

$$x - 6000 = -1.5(250)$$

$$x = 6000 - 1.5(250) = \boxed{5625}$$

Sep 20-8:44 AM

A manager had a Z-Score of 2.

Find his/her Salary.

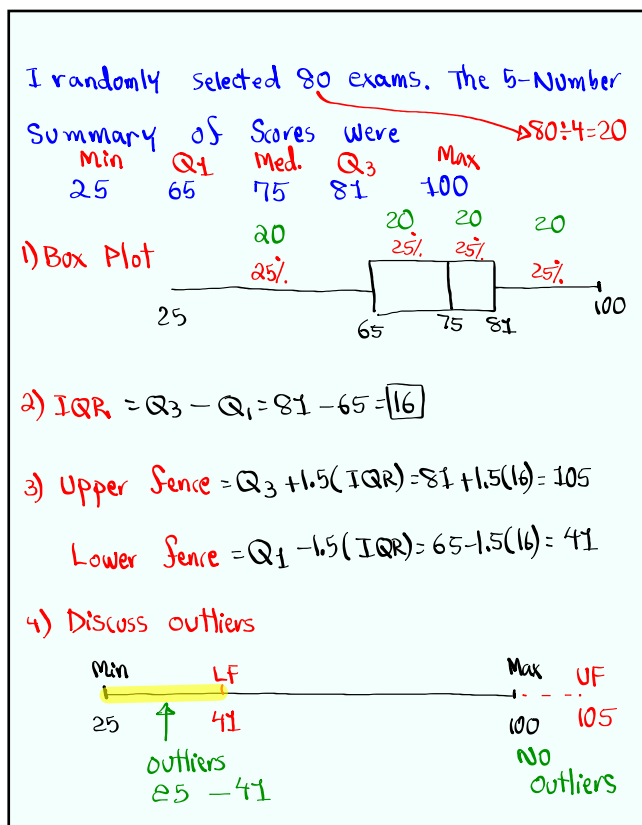
$$Z = \frac{x - \bar{x}}{S}$$

$$2 = \frac{x - 5000}{200}$$

Cross-Multiply

$$x - 5000 = 2(200) \rightarrow \boxed{x = 5400}$$

Sep 20-8:53 AM



Sep 20-9:11 AM

TI Instructions:

- 1) 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
5:Setup Editor
Enter

Sep 20-9:19 AM

How to find \bar{x} & S :

STAT → **CALC** → **1: 1-Var Stats** → **2nd** **1**

$\bar{x} = 26.8\bar{3}$

$S = 10.599$

$n = 12$

↓

Min = 10

$Q_1 = 18.5$

Med = 26.5

$Q_3 = 36.5$

Max = 42

5-Number Summary

what about S^2 ?

VARs

5: Statistics

3: Sx **χ^2** **Enter**

$S^2 = 112.\bar{3}$

$= \frac{337}{3}$

Reduced Fraction

MATH **1: Frac** **Enter**

Sep 20-9:36 AM

Clear all lists

2nd **+** **4: Clear All lists** **Enter**

Store the following in L1: **STAT** **Edit**

1: Edit

35	28	18	20	30
40	45	32	25	25
42	38	28	19	29
45	37	26	26	20

L1

35

28

↑ 18

↑ 20

quit & Clear Screen

Sep 20-9:46 AM

Sort L1, view L1, make Stem Plot

STAT **Edit** **2nd** **1** **Enter**
2:SortA

2nd **1** **Enter**

{ 18 19 20 20
 → → →

1 | 89
 2 | 00 5566889
 3 | 02578
 4 | 0255

Sep 20-9:52 AM

Find \bar{x} & S^2 :

STAT **→** **CALC**
1:1-Var Stats

$\bar{x} = 30.4$

$S = S_x = 8.550$

$n = 20$

Min = 18

$Q_1 = 25$

Med. = 28.5

$Q_3 = 37.5$

Max = 45

↓
 ↓
 ↓
 ↓

Menu } No Menu
 List: L1 } L1
 FreqList: **clear** } **Enter**
Calculate

Find S^2 in reduced fraction

VARS **5: Statistics** **3: Sx**

x² **MATH** **1: ▸ frac** **Enter**

$S^2 = \frac{6944}{95}$

Sep 20-9:55 AM

Working with grouped data:

class limits	class MP	class F
18-25	21.5	2
26-33	29.5	10
34-41	37.5	8

Find \bar{x} & S

clear all lists
class MP \rightarrow L1
class F \rightarrow L2

L1	L2
21.5	2
29.5	10
37.5	8

STAT \rightarrow CALC \rightarrow 1:1-Var Stats

Menu
List: L1
FreqList: L2
Calculate

NO Menu
L1, L2
Enter

$\bar{x} = 31.9$
 $S_x = 5.256$
 $n = 20$

Find S^2 in reduced fraction

VAR S 5: Statistics 3: S_x x^2
MATH 1: $\frac{\square}{\square}$ Enter $\frac{2624}{95}$

Sep 20-10:16 AM

Complete the chart below

class BNDRS	class MP	class F	Cum. F
18.5 - 29.5	24	7	7
29.5 - 40.5	35	10	17
40.5 - 51.5	46	23	40
51.5 - 62.5	57	10	50

Find \bar{x} & S

clear all lists
class MP \rightarrow L1
class F \rightarrow L2
Use 1-Var Stats
with L1 & L2

$\bar{x} = 42.92$
 $S = S_x = 10.433$
 $n = 50$

Find S^2 in reduced fraction

$S^2 = \frac{133342}{1225}$

Sep 20-10:26 AM

Working with ordered-pairs

x	y
2	5
3	7
4	7
5	10

clear all lists, $x \rightarrow L1$, $y \rightarrow L2$

STAT \rightarrow **CALC**

2: 2-Var Stats

$\Sigma x = 14$	Menu	} No Menu L1, L2 7 Enter
$\Sigma x^2 = 54$	xlist: L1	
$n = 4$	Ylist: L2	
$\Sigma y = 29$	Freq List: clear	
$\Sigma y^2 = 223$	Calculate	
$\Sigma xy = 109$		

Sep 20-10:37 AM

STAT \rightarrow **CALC**

8: Lin Reg (a+bx)

$a = 2$	Menu	} No Menu L1, L2 7 Enter
$b = 1.5$	xlist: L1	
$r^2 = .882$	Ylist: L2	
$r = .939$	clear	
	Calculate	

If r & r^2 are missing:

2nd **0** **6** **6** **↓** **---** **↓** **Diagnostic On** **Enter** **Enter**

Sep 20-10:44 AM

Class Quiz 3

Consider the Sample below

28 32 25 30 18

40 38 20 17 33

Find

$$1) \bar{x} = 28.1 = \boxed{28}$$

$$2) s = 8.048 = \boxed{8}$$

} Round to
whole #

$$3) n = \boxed{10}$$

$$4) s^2 = \boxed{\frac{1943}{30}}$$

} Reduced
fraction

Sep 20-10:50 AM