

Statistics

Lecture 5



Feb 19-8:47 AM

I randomly Selected 16 Students and here are their ages.

25	32	18	40
35	20	19	42
28	25	39	50
24	18	27	30

$$1) n = 16$$

$$2) \text{Min} = 18, \text{Max} = 50$$

$$3) \text{Range} = \text{Max} - \text{Min} = 32$$

$$4) \text{Midrange} = \frac{\text{Max} + \text{Min}}{2} = 34$$

5) Estimate Sample Standard deviation

$$S \approx \frac{\text{Range}}{4}$$

the range rule-of-thumb

$$S \approx \frac{32}{4} = 8$$

Sep 17-10:35 AM

25 32 18 40
35 20 19 42
28 25 39 50
24 18 27 30

Store this data set in
a list.

Clear all lists

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

Reset all lists

Enter these numbers
in L1.

STAT **Edit**
1:Edit

L1
25 **Enter**
32 "
18 "
...
30 **Enter**

STAT **Edit** **Enter**
5:Set up editor

Let's quit & clear
Screen

2nd **MODE** **clear**

Sep 17-10:41 AM

View L1

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

{ 25 32 18 40 . . . 27 30 }
→ → →
← ← ←

Sort L1, then view it.

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

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

{ 18 18 19 20 . . . 50 }
→ → →

1 | 889
2 | 045578
3 | 0259
4 | 02
5 | 0

Now we can make Stem Plot

Sep 17-10:48 AM

Find $\bar{x}$ & s .

[STAT] → [CALC]

[1:1-Var Stats]

with Menu

List: L1

FreqList: [Clear]

[Calculate]

[2nd] [1]

NO Menu

1-Var Stats

L1

[Enter]

Min = 18

$Q_1 = 22$

Med. = 27.5

$Q_3 = 37$

Max = 50

5-Number
Summary

Box Plot

IQR
UF, LF

Outliers

$\bar{x} = 29.5$

$s = s_x = 9.515$

$n = 16$

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Sep 17-10:55 AM

let's find s^2 in reduced fraction.

[VARS] [5:Statistics] [3: s_x] [x^2] [MATH]

[1:►frac]

[Enter]

$$s^2 = \frac{1358}{15}$$

Clear all lists

[2nd] [+] [4:Clear all lists] [Enter] [Clear]

Sep 17-11:02 AM

I randomly selected 20 exams, here are the Scores:

73	85	65	90
100	68	55	92
80	70	60	88
98	100	75	82
78	86	93	99

Store in L1

[STAT] Edit
1:Edit

View L1

[2nd] [1] [Enter]

Sort L1

[STAT] Edit

2:SortA [Enter]

Make STEM Plot

L1
73
85
...
99

View L1 again

[2nd] [1] [Enter]

{55 60 65 68

→ → →

5	5
6	0 5 8
7	0 3 5 8
8	0 2 5 6 8
9	0 2 3 8 9
10	0 0

Sep 17-11:07 AM

Find $\bar{x}$ & s

[STAT] [→] CALC

1:1-Var Stats

With Menu

List: L1

FreqList: [clear]

[Calculate]

[2nd] [1]

No Menu

1-Var Stats

L1

[Enter]

Min = 55

$Q_1 = 71.5$

Med = 83.5

$Q_3 = 92.5$

Max = 100

$\bar{x} = 81.85$

$s = s_x = 13.632$

$n = 20$

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Sep 17-11:17 AM

Find S^2 in reduced fraction

[VARS]
[5: Statistics]
[3: S_x]
 χ^2
[MATH]
[1: $\rightarrow$ Frac]
[Enter]

$$S^2 = \frac{70611}{380}$$

Sep 17-11:23 AM

Percentile & Percentile ranking

* Data must be Sorted *

Notation P_k

$k\%$ $(100-k)\%$
 P_k

P_{10} 10% 90%
 P_{10}

P_{80} 80% 20%
 P_{80}

P_{50} 50% 50%
 P_{50}
Median

Sep 17-11:27 AM

How to find P_k :

1) Find location

$$L = \frac{k}{100} \cdot n$$

Sample Size

if decimal $\rightarrow$ Round-up to a whole #

$$P_k = L^{\text{th}} \text{ element}$$

$$\text{if whole \#} \rightarrow P_k = \frac{L^{\text{th}} \text{ element} + \text{Next element}}{2}$$

Sep 17-11:30 AM

5	5
6	0 5 8
7	0 3 5 8
8	0 2 5 6 8
9	0 2 3 8 9
10	0 0

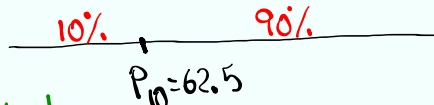
$$n = 20$$

find P_{10}

$$L = \frac{10}{100} \cdot 20 = 2 \quad \leftarrow \text{whole \#}$$

$$P_{10} = \frac{\text{2nd element} + \text{Next element}}{2}$$

$$= \frac{60 + 65}{2} = 62.5$$

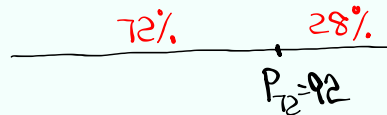


find P_{12}

$$L = \frac{12}{100} \cdot 20 = 2.4 \quad \leftarrow \text{Decimal}$$

$$L = 15$$

$$P_{12} = 15^{\text{th}} \text{ element} = 92$$



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5 | 5
 6 | 0 5 8
 7 | 0 3 5 8
 8 | 0 2 5 6 8
 9 | 0 2 3 8 9
 10 | 0 0

Diving reverse

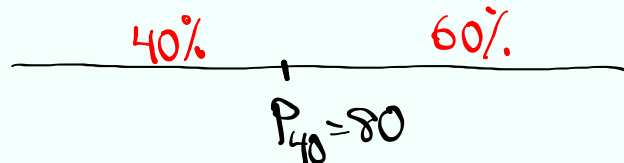
Find K such that $P_K = 80$
 Below

$$K = \frac{B}{n} \cdot 100 \quad \text{Round to whole \%}$$

Sample Size

$$K = \frac{8}{20} \cdot 100 = \boxed{40}$$

$$P_{40} = 80$$



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Consider the STEM plot below

2 | 4 5 8
 3 | 0 2 5 5 8 9
 4 | 0 3 5 5 7 8 8 9
 5 | 2 3 5 8 8 8 9
 6 | 0 3 6 8
 7 | 0 2 5

$$1) n = 32$$

$$2) \text{Range} = 75 - 24 = 51$$

$$3) \text{Mode} = 45 \text{ \& } 58$$

$$4) \text{Estimate } S \approx \frac{\text{Range}}{4} = \frac{51}{4} = \boxed{12.75}$$

5) Store in L1, Find $\bar{x}$, S , and S^2 .

$$\text{Min} = 24$$

$$Q_1 = 38.5$$

$$\text{Med} = 48$$

$$Q_3 = 58.5$$

$$\text{Max} = 75$$

$$S^2 = \frac{194951}{992}$$

$$\bar{x} = 48.844$$

$$S = S_x = 14.019$$

$$n = 32$$

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Sep 17-11:58 AM

2		4	5	8					
3		0	2	5	5	8	9		
4		0	3	5	5	7	8	8	9
5		2	3	5	8	8	8	9	
6		0	3	6	8				
7		0	2	5					

Find P_{20}

$$L = \frac{20}{100} \cdot 32$$

$$= 6.4 \rightarrow L = 7$$

 $P_{20} = 7\text{th element}$

$$= \boxed{35}$$

20% 80%
 $P_{20} = 35$

median
 Find P_{50}

$$L = \frac{50}{100} \cdot 32 = 16$$

$$P_{50} = \frac{\text{16th element} + \text{Next element}}{2}$$

$$= \frac{48 + 48}{2} = 48$$

Sep 17-12:11 PM

2		4	5	8					
3		0	2	5	5	8	9		
4		0	3	5	5	7	8	8	9
5		2	3	5	8	8	8	9	
6		0	3	6	8				
7		0	2	5					

Find K such that $P_K = 55$

Below

$$K = \frac{B}{n} \cdot 100$$

Round to
whole %

$$= \frac{20}{32} \cdot 100 = 62.5 \approx 63$$

 $P_{63} = 55$

63% 37%
 $P_{63} = 55$

Sep 17-12:16 PM

Complete the chart below

	class limits	class MP	class F
	18 - 28	23	5
Revised class limits	29 - 39	34	12
	40 - 50	45	8

1) class width = 11

2) $n = \sum F = 25$

How to find $\bar{x}$ & s of group data:

class MP $\rightarrow$ L1

class F $\rightarrow$ L2

L1	L2
23	5
34	12
45	8
$\rightarrow$	

STAT $\rightarrow$ CALC

1:1-Var Stats

with Menu

List: L1

FreqList: L2

Calculate

2nd 1

No Menu

1-Var Stats

L1, L2

Enter

2nd 2

$$\bar{x} = 35.32$$

$$s = s_x = 7.983$$

$$n = 25$$

$$s^2 = \frac{9559}{150}$$

Sep 17-12:20 PM