

Statistics

Lecture 6



Feb 19-8:47 AM

Complete the chart below

Class limits	Class MP	class F	Com. F
20 - 30	25	5	5
31 - 41	36	8	13
42 - 52	47	12	25
53 - 63	58	5	30

1) 4 classes
 2) CW = 11
 3) $n = 30$

Find \bar{x} & S of this grouped data.

1) clear all lists
 2) class MP \rightarrow L1, class F \rightarrow L2

STAT \rightarrow CALC
 1:1-Var Stats
 with menu } No Menu
 List: L1 } L1, L2 [Enter]
 FreqList: L2 } [7]
 [Calculate]

$\bar{x} = 42.2\bar{3}$
 $S = S_x = 10.686$
 $n = 30$

Find S^2 in reduced fraction
 VARS 5: Statistics 3: S_x^2 [Enter]
 MATH 1: \rightarrow Frac [Enter]

$$\frac{99\ 341}{870}$$

Sep 16-12:37 PM

Complete the chart below

Class BNDRS	class MP	Class F
14.5 - 22.5	18.5	12
22.5 - 30.5	26.5	18
30.5 - 38.5	34.5	10

1) 3 classes
2) CW = 8
3) $n = \sum f = 40$

class MP → L1

class F → L2

[STAT] → CALC

1:1-Var Stats

use L1 & L2

find S^2 in reduced fraction

$$S^2 = \frac{2336}{65}$$

$$\bar{x} = 26.1$$

$$S = 5.995$$

$$n = 40$$

Sep 16-12:49 PM

Given $n=10$, $\sum x = 241$, $\sum x^2 = 6189$

Min. = 15, Max = 35

1) Range = $35 - 15 = 20$ 2) Midrange = $\frac{35+15}{2} = 25$

3) $\bar{x} = \frac{\sum x}{n} = \frac{241}{10} = 24.1$ 4) Estimate $S \approx \frac{\text{Range}}{4}$

5) $S^2 = \frac{n \sum x^2 - (\sum x)^2}{n(n-1)} = \frac{10 \cdot 6189 - 241^2}{10(10-1)} = \frac{3809}{90}$

6) $S = \sqrt{S^2}$ [MATH] [1:] [Sqrt] [Enter]

$= \sqrt{42.322}$ [MATH] [2:] [Dec] [Enter]

≈ 6.506 42.32

42.322

when S is small, Data elements are close to \bar{x} .

when S is big, data elements are more spread out from \bar{x} .

when $S=0$, All data elements are the same as \bar{x} .

Sep 16-12:58 PM

Given $n=8$, $\sum x = 48$, $\sum x^2 = 288$

$$1) \bar{x} = \frac{\sum x}{n} = \frac{48}{8} = \boxed{6}$$

$$2) S^2 = \frac{n \sum x^2 - (\sum x)^2}{n(n-1)} = \frac{8 \cdot 288 - 48^2}{8(8-1)} = \frac{0}{56} = \boxed{0}$$

$$3) S = \sqrt{S^2} = \sqrt{0} = 0$$

Since $S=0$, All data elements are the same as $\bar{x}=6$.

Sep 16-1:11 PM

Store the following in L1.

82 75 68 100 90

58 80 72 70 95

55 65 88 77 100

72 84 96 65 90

Sort L1

View L1

Make Stem Plot

```

5 | 58
6 | 558
7 | 02257
8 | 0248
9 | 0056
10 | 00
  
```

Sep 16-1:16 PM

Find \bar{x} & S

$$\bar{x} = 79.1$$

$$S = 13.599$$

$$n = 20$$

$$\text{Min} = 55$$

$$Q_1 = 69$$

$$\text{Med.} = 78.5 \checkmark$$

$$Q_3 = 90$$

$$\text{Max} = 100$$

Find S^2 in reduced fraction.

$$S^2 = \frac{17569}{95}$$

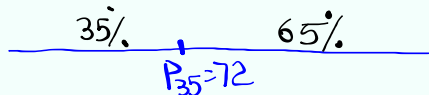
Sep 16-1:22 PM

5	58
6	558
7	02257
8	0248
9	0056
10	00

Find P_{35}

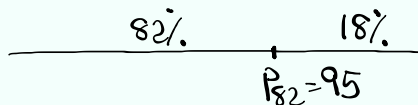
$$L = \frac{35}{100} \cdot 20 = 7$$

$$P_{35} = \frac{7\text{th} + 8\text{th}}{2} = \frac{72 + 72}{2} = 72$$

Find P_{82}

$$L = \frac{82}{100} \cdot 20 = 16.4 \quad L = 17$$

$$P_{82} = 17\text{th element} = 95$$

Find Median = P_{50}

$$L = \frac{50}{100} \cdot 20 = 10$$

$$P_{50} = \frac{10\text{th} + 11\text{th}}{2} = \frac{77 + 80}{2} = 78.5$$

Sep 16-1:26 PM

5	58
6	558
7	02257
8	0248
9	0056
10	00

Find k such that $P_k = 70$

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

below ↑

$$= \frac{5}{20} \cdot 100 = 25 \quad P_{25} = 70$$

Find k such that $P_k = 80$

$$k = \frac{B}{n} \cdot 100 = \frac{10}{20} \cdot 100 = 50$$

below ↑

Sep 16-1:31 PM

Class Quiz 3

Consider the Sample below

78 65 80 55 89

100 70 68 90 95

96 82 74 70 60

Find the

5-Number
Summary.

Store in L1

STAT → Calc

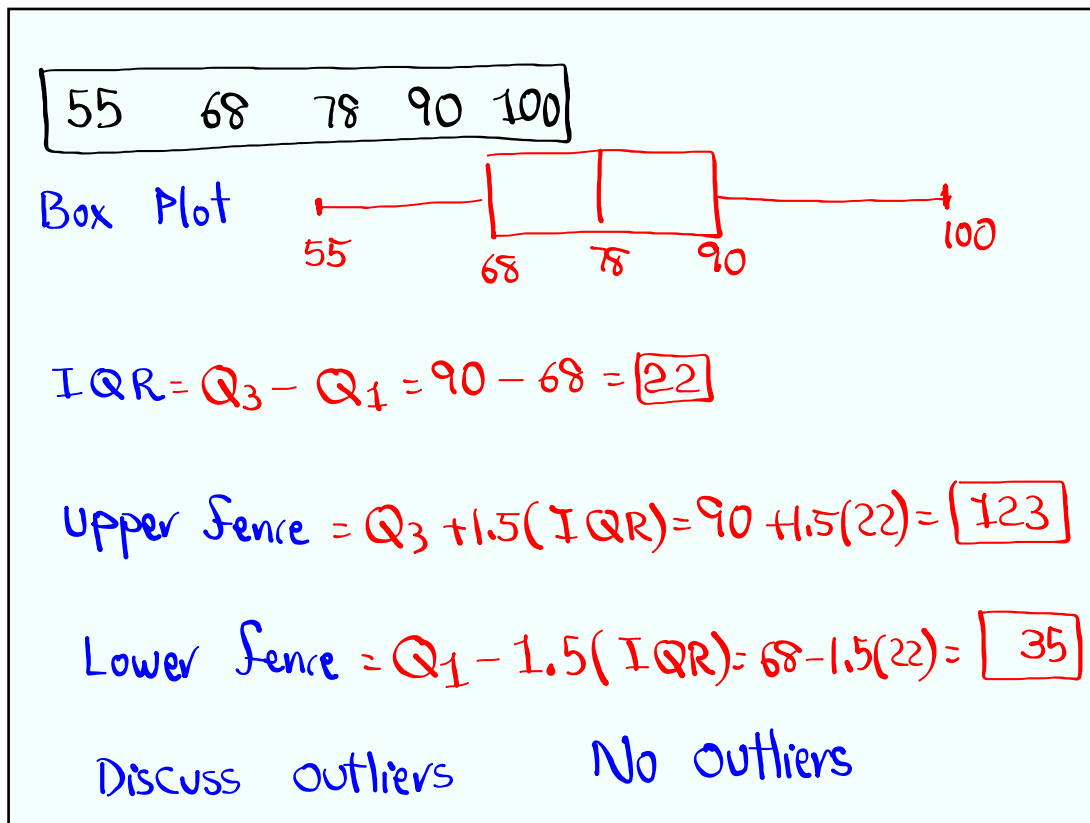
1:1-Var Stats

↓ use L1

↓

55 68 78 90 100

Sep 16-1:35 PM



Sep 16-1:59 PM

A sample of 150 students had a mean age of 28 and standard deviation of 6.

1) 68% Range
 $\bar{x} \pm S = 28 \pm 6$
 $\Rightarrow 22 \text{ to } 34$

2) Usual Range
 95% Range
 $\bar{x} \pm 2S$
 $= 28 \pm 2(6) \Rightarrow 16 \text{ to } 40$

3) what % of the sample is below 40?
 2.5% 95% 2.5% 97.5%
 16 40

4) How many of those students were unusually old?
 2.5% of 150
 $= .025(150) = 3.75$
 ≈ 4

Sep 16-2:04 PM

A Sample has a mean of 78 \pm standard deviation of 8.

1) Find a Z-Score for data element 95.

Usual or Unusual? Explain

$$Z = \frac{x - \bar{x}}{s} = \frac{95 - 78}{8} = \boxed{2.125}$$

unusual

$Z < -2$ or $Z > 2$

2) Find the data element with Z-Score

of -1.875.

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

$$-1.875 = \frac{x - 78}{8}$$

$-2 \leq Z \leq 2$

Cross-Multiply

$$x - 78 = 8(-1.875)$$

$$x = 78 - 15 \rightarrow \boxed{x = 63}$$

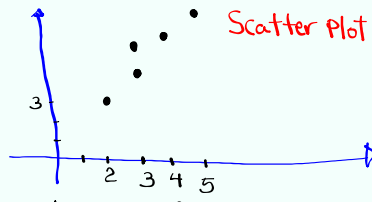
Usual

Sep 16-2:11 PM

Working with ordered-Pairs

x	y
2	3
3	5
3	7
5	10
4	8

Plot these Points



x \rightarrow L1, y \rightarrow L2

STAT \rightarrow CALC

2:2-Var Stats

With Menu

xlist: L1

Ylist: L2

Freq List:

NO Menu

L1, L2

$$\sum x = 17$$

$$\sum x^2 = 63$$

$$n = 5$$

$$\sum y = 33$$

$$\sum y^2 = 247$$

$$\sum xy = 124$$

Sep 16-2:18 PM

Complete the chart below

x	y	x^2	y^2	xy
1	3	1	9	3
2	5	4	25	10
2	6	4	36	12
4	8	16	64	32

$x \rightarrow L1, y \rightarrow L2$

Use 2-Var Stats

$$\sum x = 9 \checkmark$$

$$\sum x^2 = 25 \checkmark$$

$$\sum y = 22 \checkmark$$

$$\sum y^2 = 134 \checkmark$$

$$\sum xy = 57 \checkmark$$

Sep 16-2:27 PM