

Statistics

Lecture 11



Feb 19-8:47 AM

Class QZ 3

Consider the Sample below

21 28 20 35 38

20 40 45 50 48

Find

$$\bar{x} = 34.5 = \boxed{35}$$

$$S = 11.645 = \boxed{12}$$

$$S^2 = \frac{2441}{18}$$

} Round to
whole #

} Reduced
fraction

Sep 11-9:48 AM

what is standard deviation?

It is a non-negative numerical value that indicates how close the data dist. is to the mean.

Sample standard deviation S

$$S = \sqrt{S^2} \quad S^2 \text{ Sample Variance}$$

$$S^2 = \frac{\sum (x - \bar{x})^2}{n-1} \quad S^2 = \frac{n \sum x^2 - (\sum x)^2}{n(n-1)}$$

If S is small, data elements are close to \bar{x} .

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

If $S=0$, All data elements are equal to \bar{x} .

Sep 12-9:00 AM

Consider the Sample below

2, 3, 3, 3, 4

$$\bar{x} = 3$$

store in LI, find \bar{x} & S . $S = .707$

Consider the Sample below

1, 2, 2, 2, 50

$$\bar{x} = 11.4$$

store in LI, find \bar{x} & S $S = 21.582$

Consider the Sample below

8 8 8 8 8

$$\bar{x} = 8$$

store in LI, find \bar{x} & S $S = 0$

Sep 12-9:06 AM

How to find \bar{x} & S for group data:

class MP	class F
8	2
13	4
18	6
23	3

$L1$ { 8, 13, 18, 23 }
 $L2$ { 2, 4, 6, 3 }

$\bar{x} = 16.\bar{3}$
 $S = 4.880$
 $n = 15$

Clear all lists
 class MP \rightarrow L1
 class F \rightarrow L2
STAT \rightarrow **CALC**
 1:1-Var Stats
 With Menu: List: L1, FreqList: L2, **Calculate**
 No Menu: L1, L2, **Enter**

Find S^2 in Reduced Fraction

VARS **5: Statistics** **3: Sx** **x²** **Math** **1: Frac** **Enter**
 $\frac{500}{21}$

Sep 12-9:17 AM

Complete the table below

class limits	class MP	class F	Cum. F
10 - 18	14	5	5
19 - 27	23	8	13
28 - 36	32	17	30
37 - 45	41	10	40

$n = 40$

use class MP & class F to find \bar{x} & S .

class MP \rightarrow L1 **STAT** \rightarrow **CALC**
 class F \rightarrow L2 1:1-Var Stats
 $\bar{x} = 30.2$
 $S = 8.695$
 $n = 40$
 Make sure to use L1 & L2

find S^2 in reduced fraction.

VARS **5: Statistics** **3: Sx** **x²** **Math** **1: Frac** **Enter**
 $\frac{378}{5}$

Sep 12-9:26 AM

Consider the stem Plot below

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

1) $n = 25$

2) Range = $100 - 60 = 40$

3) Estimate $S \approx \frac{\text{Range}}{4} = \frac{40}{4} = 10$

4) P_{30}

$L = \frac{30}{100} \cdot 25 = 7.5 \rightarrow L = 8$

$P_{30} = 8^{\text{th}}$ element

$= 75$

30% | 70%

$P_{30} = 75$

5) P_{60}

$L = \frac{60}{100} \cdot 25 = 15$

$P_{60} = \frac{15^{\text{th}} \text{ element} + 16^{\text{th}} \text{ element}}{2}$

$= \frac{86 + 88}{2} = 87$

60% | 40%

$P_{60} = 87$

Sep 12-9:38 AM

6) Find k such that $P_k = 90$

$k = \frac{B}{n} \cdot 100$ Round to whole%
Below

$= \frac{18}{25} \cdot 100 = 72$

$P_{72} = 90$

72% | 28%

$P_{72} = 90$

7) Find the median

Median = P_{50}

$P_{50} = 13^{\text{th}}$ element

$L = \frac{50}{100} \cdot 25 = 12.5 \rightarrow L = 13$

$= 85$

50% | 50%

Med = 85

Sep 12-9:46 AM

Sample of 80 students was randomly selected. The 5-Number Summary of their ages were 18 28 32 36 95

1) Draw Box Plot



2) How many students were at least 28?

60

$$3) IQR = Q_3 - Q_1 = 36 - 28 = 8$$

$$4) \text{ Upper Fence} = Q_3 + 1.5(IQR) = 36 + 1.5(8) = 48$$

$$\text{Lower Fence} = Q_1 - 1.5(IQR) = 28 - 1.5(8) = 16$$

5) Discuss outliers.

No outlier below 16

48-95 are outliers

SG
5-8

Sep 12-9:50 AM