

# Statistics

## Lecture 10



Feb 19-8:47 AM

1) Clear all lists.

`2nd` `+` `4:Clear all Lists` `Enter`

2) Reset all lists.

`STAT` `Edit` `Enter`  
`5:SetupEditor`

I randomly selected 25 exams, here are the Scores.

72	86	95	100	68	Store in L1
70	55	80	60	90	<code>STAT</code> <code>Edit</code>
73	84	98	100	65	<code>1:Edit</code>
58	79	70	84	84	
84	90	83	75	65	

quit & clear screen

`2nd` `MODE` `Clear`

	L1
	72
↑	86
↑	95
	⋮
↑	65

Sep 11-8:51 AM

Find  $\bar{x}$  &  $S$ .

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

$\bar{x} = 78.72$   
 $S = S_x = 13.005$

↓ Min. = 55  
 ↓  $Q_1 = 69$   
 ↓ Med. = 80  
 ↓  $Q_3 = 88$   
 ↓ Max = 100

5-Number Summary

With Menu } NO Menu  
 List: L1 } L1  
 FrqList: **clear** } **Enter**  
**Calculate**

Find  $S^2$  in reduced frac.

**VARS** **5:Statistics** **3:Sx**  
 $\chi^2$  **Math** **1:Frac** **Enter**

Range =  $100 - 55 = 45$

Estimate  $S \approx \frac{\text{Range}}{4}$   
 $= \frac{45}{4} = 11.25$

$S^2 = \frac{25369}{150}$

Sep 11-8:59 AM

Sort **L1**, view **L1**, then make Stem Plot

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

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

{ 55 58 60 65 65 ... 100 }  
 → → →

5 | 58  
 6 | 0558  
 7 | 002359  
 8 | 0344446  
 9 | 0058  
 10 | 00

Sep 11-9:09 AM

5	58
6	0558
7	002359
8	0344446
9	0058
10	00

1) How many data elements are below 70? 6

2) What % of data elements are below 70?

Sample Size  $\rightarrow \frac{6}{25} \cdot 100 = \boxed{24\%}$

Sep 11-9:14 AM

Percentile → Data must be Sorted.

Notation  $P_k$

$k\%$  of sorted data falls below  $P_k$

$$\frac{k\%}{\quad} \quad \frac{(100-k)\%}{\quad}$$

$$P_k$$

$P_{20}$ 

$$\frac{20\%}{\quad} \quad \frac{80\%}{\quad}$$

$$P_{20}$$

$P_{90}$ 

$$\frac{90\%}{\quad} \quad \frac{10\%}{\quad}$$

$$P_{90}$$

Sep 11-9:16 AM

### How to Find $P_k$

1) Location  $L = \frac{k}{100} \cdot n$

If decimal  $\rightarrow$  Round-up to a whole #  
that is the location of  $P_k$ .

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

Find  $P_{10}$

$P_{10} = 3^{\text{rd}} \text{ element}$

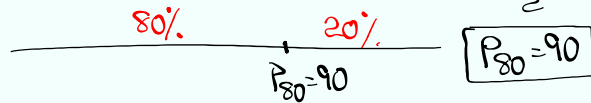
$L = \frac{10}{100} \cdot 25 = 2.5 \rightarrow L = 3$

$P_{10} = 60$

Find  $P_{80}$

$L = \frac{80}{100} \cdot 25 = 20$

$P_{80} = \frac{20^{\text{th}} \text{ element} + \text{Next one}}{2}$   
 $= \frac{90 + 90}{2} = 90$



Sep 11-9:19 AM

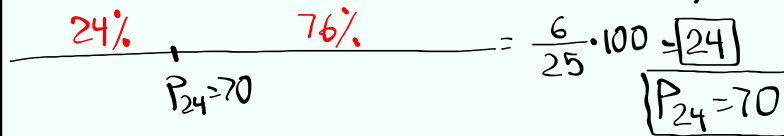
5	58
6	0558
7	002359
8	034446
9	0058
10	00

### Doing Reverse

Find  $k$  such that  $P_k = 70$

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

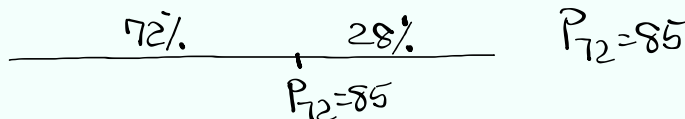
Sample Size



Find  $k$  such that  $P_k = 85$

$B = 18$   
 $n = 25$

$k = \frac{B}{n} \cdot 100 = \frac{18}{25} \cdot 100$   
 $= 72$



Sep 11-9:25 AM

Consider the Stem Plot below:

1	89
2	02557
3	03566689
4	235589
5	36889
6	028
7	0

1)  $n=30$

2) Find  $P_{20}$

$$L = \frac{20}{100} \cdot 30 = 6 \text{ whole \#}$$

$$P_{20} = \frac{6^{\text{th}} + 7^{\text{th}}}{2} = \frac{25 + 27}{2} = 26$$

$P_{20} = 26$

3) Find  $P_{55}$

$$L = \frac{55}{100} \cdot 30 = 16.5 \text{ \# Decimal } L=17$$

$$P_{55} = 17^{\text{th}} \text{ element} = 43$$

4) Find  $k$  such that  $P_k = 50$

$$k = \frac{B}{n} \cdot 100 = \frac{21}{30} \cdot 100 = 70$$

70%      30%

$P_{70} = 50$

Median =  $P_{50}$

$$L = \frac{50}{100} \cdot 30 = 15$$

$$= \frac{15^{\text{th}} + 16^{\text{th}}}{2} = \frac{39 + 42}{2} = 40.5$$

Sep 11-9:30 AM

Clear all lists

L1	L2
24	3
34	7
44	10
54	5

→

$\bar{x} = 40.8$

$S_x = 9.452$

$n = 25$

**STAT** → **CALC**

**1: 1-Var Stats**

Menu      No Menu

List:L1      L1, L2

FreqList:L2      **7**

**Calculate**      **Enter**

Sep 11-9:41 AM

Class QZ 3

Consider the Sample below Find

21 28 20 35 38

20 40 45 50 48

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

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

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

} Round to  
whole #

} Reduced  
fraction

Sep 11-9:48 AM