

**Statistics  
Lecture 7**



Feb 19-8:47 AM

Clear all lists.

use the chart below

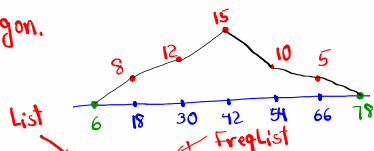
class MP	class F
18	8
30	12
42	15
54	10
66	5

1) # classes → 5

2) class width =  $30 - 18 = 42 - 30 = 54 - 42 = 12$

3) Sample Size  
 $n = \sum f = 8 + 12 + 15 + 10 + 5 = 50$

4) Draw Freq. Polygon.



class MP → L1

class F → L2

use 1-Var Stats

with L1 & L2 to find  
 Find  $S^2$  in reduced fraction.

$\bar{x} = 40.08$

$S = 14.619$

$n = 50$

VARs 5: Statistics 3:  $S_x^2$   $\sigma^2$   
 MATH 1: Frac Enter  $S^2 = \frac{261792}{1225}$

Nov 1-7:21 AM

Round  $\bar{x}$  &  $S$  to whole #

$$\bar{x} = 40.08 \quad \bar{x} \approx 40$$

$$S = 14.619 \quad S \approx 15$$

Use empirical rule to find

1) 68% Range =  $\bar{x} \pm S = 40 \pm 15 \rightarrow$  25 to 55

2) 95% Range =  $\bar{x} \pm 2S = 40 \pm 2(15) = 40 \pm 30 \rightarrow$  10 to 70

"Usual Range"

3) 99.7% Range =  $\bar{x} \pm 3S = 40 \pm 3(15) \Rightarrow$  -5 to 85

Nov 1-7:32 AM

Clear all lists.

Reset all lists.

Store the following in L1

48	25	32	18	20	40
30	19	25	24	35	30
42	45	32	32	38	18
50	44	52	24	27	27
20	18	30	40	38	40

Now quit  $\epsilon$

end MODE

clear screen

clear

Nov 1-7:37 AM

Sort **L1** **STAT** **Edit** **2nd** **1** **Enter**  
**2:SortA()**

View **L1** **2nd** **1** **Enter**  
 {18 18 18 19 ... 48 50 52}

Make STEM Plot

1	8889	$n=30$
2	00445577	How many data elements
3	000222588	are below 40? 21
4	0002458	
5	02	

What % of data elements are below 40?  
 $\frac{21}{30} \cdot 100 = 70 \rightarrow 70\%$

Nov 1-7:44 AM

Find  $\bar{x}$ ,  $S$ , and  $n$ .

Use **1-Var Stats** with **L1** only.

$\bar{x} = 32.1$   
 $S = 10.169$   
 $n = 30$

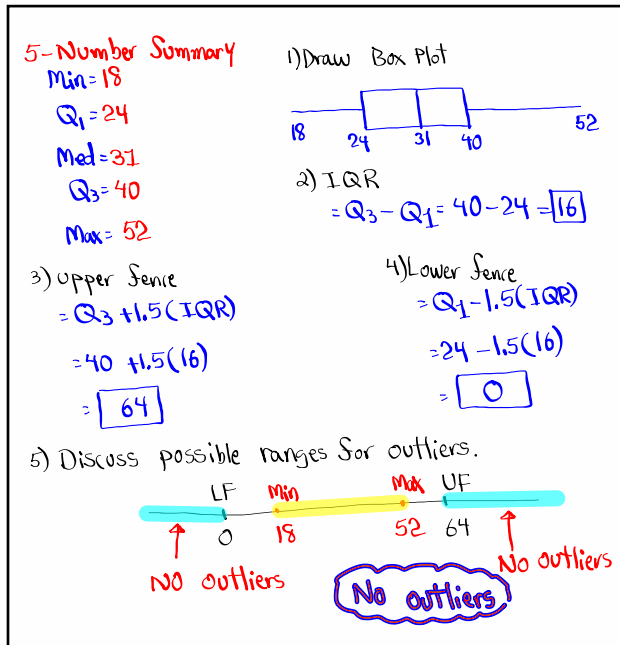
5-Number Summary

- Min = 18
- $Q_1 = 24$
- Med = 31
- $Q_3 = 40$
- Max = 52

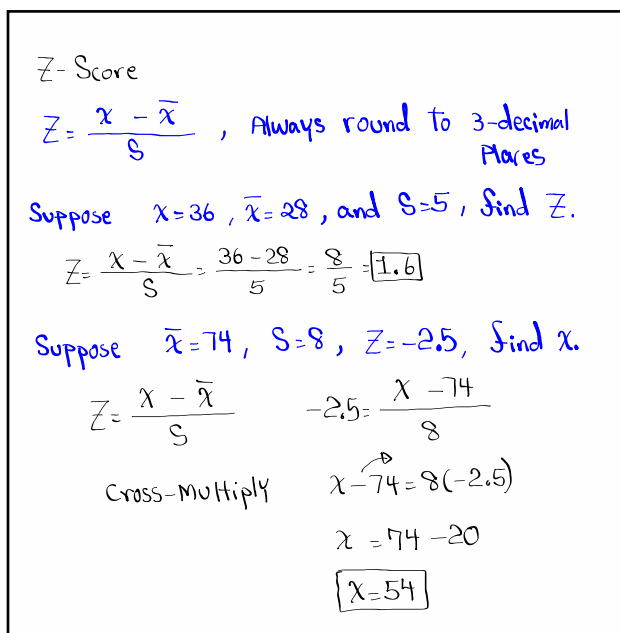
Find  $S^2$  in reduced fraction.

$$S^2 = \frac{29987}{290}$$

Nov 1-7:52 AM



Nov 1-7:59 AM



Nov 1-8:32 AM

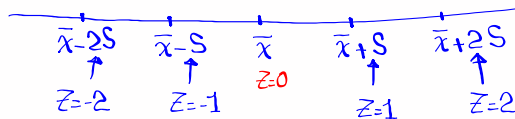


What is Z-Score?

It is a numerical value that shows how many standard deviation is the data element from the mean.

For example if  $Z=1$ , data element is 1 standard deviation above the mean.

If  $Z=-2$ , data element is 2 standard deviation below the mean.



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

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

Nov 1-8:36 AM

Suppose ages of randomly selected students has a mean of 30 and standard dev. of 6.

$$\bar{x} = 30$$

$$S = 6$$

Lisa is 25 yrs old,

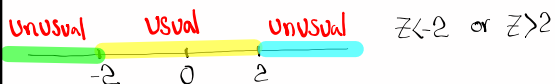
$$Z = \frac{x - \bar{x}}{S} = \frac{25 - 30}{6} = \frac{-5}{6} = \boxed{-0.833}$$

Lisa is below the average, usual age  
 $-2 \leq Z \leq 2$

John is 45 yrs old,

$$Z = \frac{x - \bar{x}}{S} = \frac{45 - 30}{6} = \frac{15}{6} = \boxed{2.5}$$

John is above average, unusual age



Nov 1-8:42 AM

Z-Scores allows us to compare data elements from different data sets.

Bryan got 88 on exam 1 and 76 on exam 2.

Exam 1:  $\bar{x}=85$ ,  $S=8$

$$Z = \frac{88 - 85}{8} = \frac{3}{8} = 0.375$$

88 was a  
Usual Score  
 $-2 \leq Z \leq 2$

Exam 2:  $\bar{x}=70$ ,  $S=2.5$

$$Z = \frac{76 - 70}{2.5} = \frac{6}{2.5} = 2.4$$

76 was an  
Unusual Score  
 $Z < -2$  or  $Z > 2$

Nov 1-8:48 AM

Lisa makes \$5000 as a nurse Per month.

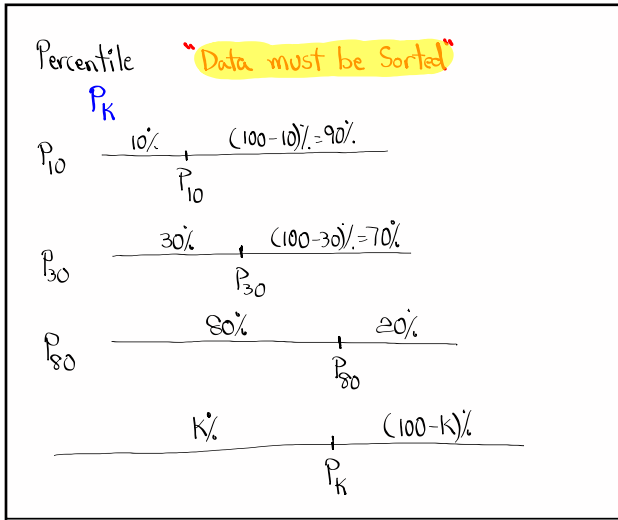
Moe makes \$6000 as a driver Per month.

Nurses:  $\bar{x}=4000$ ,  $S=400$   $Z = \frac{5000 - 4000}{400} = 2.5$  Unusual Salary

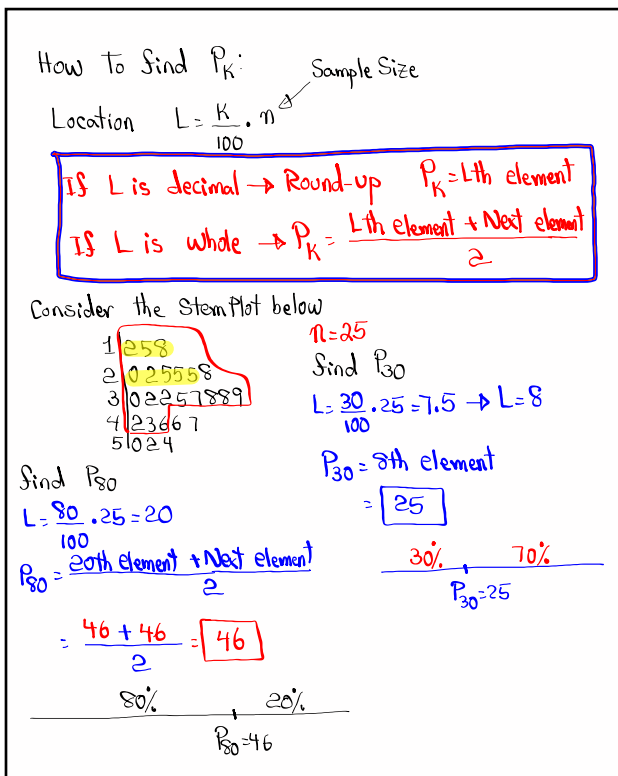
Drivers:  $\bar{x}=5200$ ,  $S=500$   $Z = \frac{6000 - 5200}{500} = 1.6$  Usual Salary

Lisa does better as a nurse

Nov 1-8:54 AM



Nov 1-9:00 AM



Nov 1-9:04 AM

Doing Reverse:

Find  $K$  such that  $P_K = 30$

Find Percentile ranking of 30

Below

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

$= \frac{9}{25} \cdot 100 = 36 \rightarrow P_{36} = 30$

9 are below 30

19 are below 45

Find  $K$  such that  $P_K = 45$

$PR = K = \frac{B}{n} \cdot 100 = \frac{19}{25} \cdot 100 = 76$

76% Below 45 Above 24%

Nov 1-9:14 AM

Consider the STEM Plot below

5 | 0 2 8

6 | 0 3 5 5 9

7 | 0 0 2 5 5 5 8 8

8 | 2 5 6 6 8

9 | 0 2 5 5

10 | 0 5

$n = 27$

$P_{20}$

$L = \frac{20}{100} \cdot 27 = 5.4 \rightarrow L = 6$

$P_{20} = 6\text{th element} = 65$

20% 80%

65

Find  $K$  such that  $P_K = 80$

$PR = K = \frac{B}{n} \cdot 100 = \frac{16}{27} \cdot 100 = 59.259... \approx 59$

$P_{59} = 80$

59% 41%

80

Nov 1-9:24 AM

$$\begin{array}{r|l} 3 & 6 \\ 4 & 58 \\ 5 & 028 \\ 6 & 03559 \\ 7 & 00255588 \\ 8 & 25668 \\ 9 & 0255 \\ 10 & 05 \end{array}$$

$n = 30$   
 $P_{50}$   
 $L = \frac{50 \cdot 30}{100} = 15$   
 $P_{50} = \frac{\text{15th element} + \text{Next element}}{2}$   
 $= \frac{75 + 75}{2} = \boxed{75}$

50%      50%  
 $P_{50} = 75$  ← Median

find  $K$  such that  $P_K = 90$        $P_{80} = 90$

Percentile ranking for 90  
 Below →  
 $PR = K = \frac{B}{n} \cdot 100 = \frac{24}{30} \cdot 100 = 80$

80%      20%  
 $P_{80} = 90$

Nov 1-9:31 AM

Class QZ 7

Use the chart below

class mp	class F
15	2
25	8
35	10
45	5

Find

- $\bar{x} = 32.2 = \boxed{32}$
- $S = 8.907 = \boxed{9}$
- $n = \boxed{25}$
- $S^2 = \frac{238}{3}$

} Round to whole #  
 } Reduced fraction

Nov 1-9:37 AM