Statistics

Lecture 4

Feb 19-8:47 AM

I randomly selected 25 exams. Here are the scores:

50	58	60	63	67
70	72	75	75	75
78	80	82	85	85
85	88	90	92	93
95	95	98	100	100

1) $n = 25$

2) Min. $= 50$ Max $= 100$

3) Range $=$ Max $-$ Min $= \boxed{50}$

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

$= \frac{100+50}{2} = \boxed{75}$

5) Mode 75 & 85
Bimodal

6) Find class width if we wish to have 4 classes.

$CW = \frac{\text{Range}}{4} = \frac{50}{4} = 12.5 \rightarrow \boxed{CW = 13}$

Mar 2-10:44 AM

class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	% F
50 – 62	49.5 – 62.5	56	3	3	.12	12%
63 – 75	62.5 – 75.5	69	7	10	.28	28%
76 – 88	75.5 – 88.5	82	7	17	.28	28%
89 – 101	88.5 – 101.5	95	8	25	.32	32%

n

CW = 13

Class MP = $\frac{\text{+class limits}}{2}$

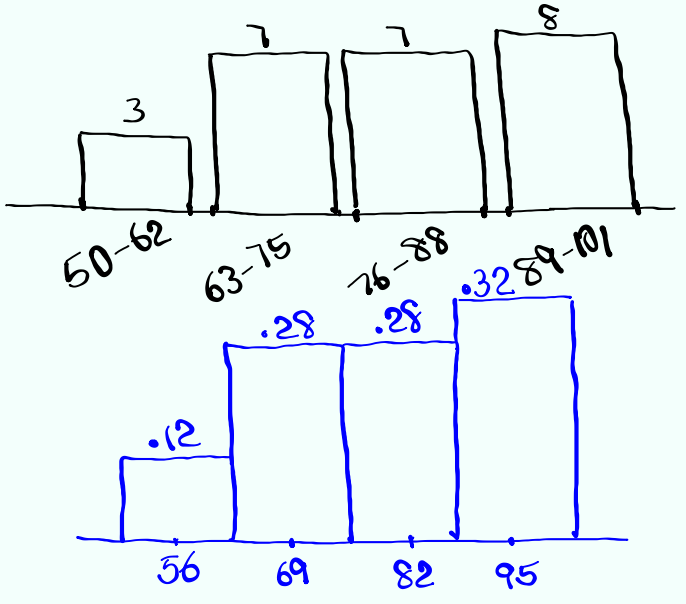
Rel. F = $\frac{f}{n}$ = $\frac{f}{25}$

Do all the graph & we go over them next time.

Mar 2-10:52 AM

Bar chart
- Class limits
- Class F

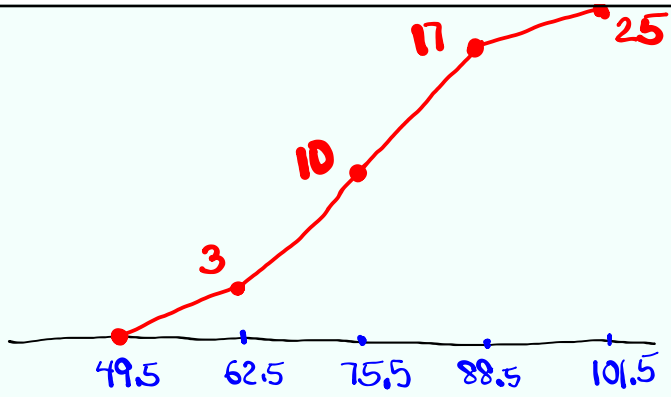
Histogram
- Class MP
- Rel. F.



Mar 4-10:06 AM

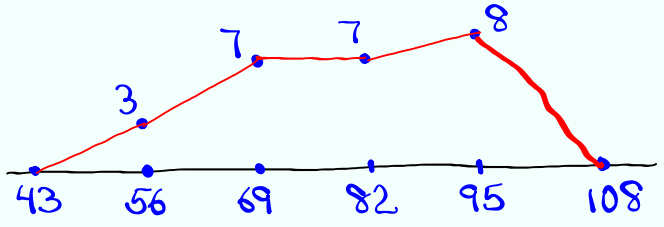
Ogive

- Class BNDRS
- Cum. F
- Start @ 0 level
- Increasing



Freq. Polygon

- Class MP
- Class F
- One extra MP on each side
- Start & Stop @ 0 level.



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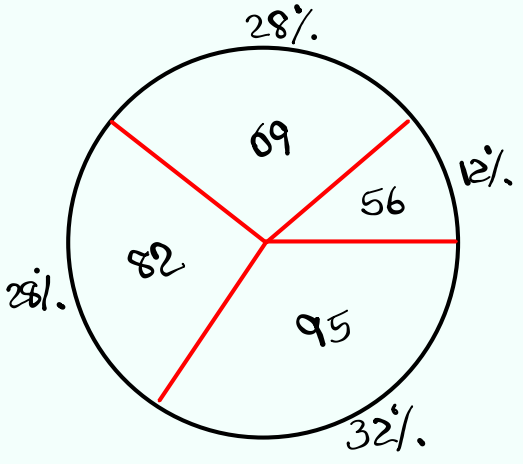
Pie Chart

- Circle
- Class MP to name slice
- % F to size each slice.



What % of scores were between 63 & 88, inclusive?

28% + 28% = 56%

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50 58 60 63 67
70 72 75 75 75
78 80 82 85 85
85 88 90 92 93
95 95 98 100 100

STEM Plot

5	08
6	037
7	025558
8	025558
9	023558
10	00

Sorted (Smallest to Largest)

How many Scores fell below 70? 5

What % of scores fell below 70?

5 is what % of 25?

$5 = \frac{P}{100} \cdot 25$

$5 = \frac{P}{4}$

$5(4) = P$

$P = 20$

20%

SG 3 & SG 4 ✓

Mar 4-8:44 AM

x → Data element

$\sum x$ → Sum of data elements

$\sum$ → Summation

n → Sample Size

$\bar{x}$ → x-bar → Sample Mean (Average)

$$\bar{x} = \frac{\sum x}{n}$$

Mar 4-10:34 AM

Consider the Sample below

2, 5, 5, 5, 8

1) $n = 5$

2) Range $= 8 - 2 = 6$

3) Midrange $= \frac{8+2}{2} = \frac{10}{2} = 5$

4) Mode 5

5) Median 5

6) $\Sigma x = 2+5+5+5+8 = 25$

7) $\bar{x} = \frac{\Sigma x}{n} = \frac{25}{5} = 5$

$\bar{x}$ — x-bar

Sample Mean

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Consider the Sample below

2 4 4 6 6 8

1) $n = 6$

2) Range $= 8 - 2 = 6$

3) Midrange $= \frac{8+2}{2} = 5$

4) Mode $= 4 \& 6$ Bimodal

5) Median $= \frac{4+6}{2} = 5$

6) $\Sigma x = 2+4+4+6+6+8 = 30$

7) $\bar{x} = \frac{\Sigma x}{n} = \frac{30}{6} = 5$

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$x \rightarrow$ Data element

$\sum x \rightarrow$ Sum of data elements

$x^2 \rightarrow$ (data element)^2

$\sum x^2 \rightarrow$ Sum of squares of data elements

$n \rightarrow$ Sample Size

$\bar{x} \rightarrow$ x-bar $\rightarrow$ Sample Mean $\quad \bar{x} = \frac{\sum x}{n}$

$s^2 \rightarrow$ Sample Variance

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

Mar 4-10:48 AM

Consider the Sample below

1 4 4 7 9

1) $n = 5$

2) $\sum x = 1+4+4+7+9 = 25$ $\qquad$ 3) $\bar{x} = \frac{\sum x}{n} = \frac{25}{5} = 5$

4) $\sum x^2 = 1^2 + 4^2 + 4^2 + 7^2 + 9^2 = 163$

5) $s^2 = \frac{n\sum x^2 - (\sum x)^2}{n(n-1)} = \frac{5 \cdot 163 - 25^2}{5(5-1)} = \frac{190}{20} = 9.5$

Mar 4-10:52 AM

Given $n=8$, $\Sigma x=49$, $\Sigma x^2=341$

Find

1) $\bar{x}=\frac{\Sigma x}{n}=\frac{49}{8}=\boxed{6.125}$

whole → 6
1-dec. → 6.1
2-dec. → 6.13

2) $s^2=\frac{n\Sigma x^2-(\Sigma x)^2}{n(n-1)}$

$=\frac{8\cdot 341-49^2}{8(8-1)}=\frac{327}{56}\approx\boxed{5.839}$

whole → 6
1-dec. → 5.8
2-dec. → 5.84

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$\bar{x}$ → Sample Mean

s^2 → Sample Variance

s → Sample Standard Deviation

$\boxed{\bar{x}=\frac{\Sigma x}{n}}$ $\boxed{s^2=\frac{n\Sigma x^2-(\Sigma x)^2}{n(n-1)}}$ $\boxed{s=\sqrt{s^2}}$

$n=5$ $\Sigma x=40$ $\Sigma x^2=320$

1) $\bar{x}=\frac{\Sigma x}{n}=\frac{40}{5}=\boxed{8}$

2) $s^2=\frac{n\Sigma x^2-(\Sigma x)^2}{n(n-1)}=\frac{5\cdot 320-40^2}{5(5-1)}$

$=\frac{0}{20}=\boxed{0}$

3) $s=\sqrt{s^2}=\sqrt{0}=\boxed{0}$

Mar 4-11:06 AM