Statistics

Lecture 2

Feb 19-8:47 AM

Consider the Sample below

0 2 2 5 6

1) Sample Size $n=5$

2) Range = Max − Min = 6 − 0 = 6

3) Midrange = $\frac{\text{Max} + \text{Min}}{2} = \frac{6+0}{2} = \frac{6}{2} = 3$

4) Mode = 2

5) $\sum x$ = 0 + 2 + 2 + 5 + 6 = 15

Summation — Data values

6) $\sum x^2 = 0^2 + 2^2 + 2^2 + 5^2 + 6^2 = 69$

7) Find $\frac{\sum x}{n} = \frac{15}{5} = 3$

8) Compute $\frac{n\sum x^2 - (\sum x)^2}{n(n-1)} = \frac{5 \cdot 69 - 15^2}{5(5-1)}$

$= \frac{120}{20} = 6$

9) Find $\sqrt{\text{last ans}}$ Round to 1-decimal

$\sqrt{6} \approx 2.4$

Aug 28-12:13 PM

Consider the Sample below

2 3 3 3 5 5 5 10

1) Sample Size $n = 8$

2) Range = Max − Min = 10 − 2 = 8

3) Midrange = $\frac{\text{Max} + \text{Min}}{2} = \frac{10+2}{2} = 6$

4) Mode = 3 & 5 Bimodal

5) $\Sigma x = 2+3+3+3+5+5+5+10 = 36$

6) $\Sigma x^2 = 2^2+3^2+3^2+3^2+5^2+5^2+5^2+10^2 = 206$

7) Find $\frac{\Sigma x}{n} = \frac{36}{8} = 4.5$

8) Find $\frac{n\Sigma x^2 - (\Sigma x)^2}{n(n-1)} = \frac{8 \cdot 206 - 36^2}{8(8-1)} = \frac{352}{56}$

≈ 6.286 Round to 3-decimal

9) $\sqrt{\text{Last ans.}}$ Round to whole # → 3

$\sqrt{6.286} \approx 2.507$

Aug 28-12:24 PM

I randomly selected 20 exams, here are the Scores.

58 59 62 65 68

70 72 75 75 75

78 81 83 85 85

85 90 95 100 100

1) Sample Size $n = 20$

2) Range = 100 − 58 = 42

3) Midrange = $\frac{100+58}{2} = 79$

4) Mode 75 & 85 Bimodal

5) Divide Range by 3

if decimal → Round-up

If whole # → +1

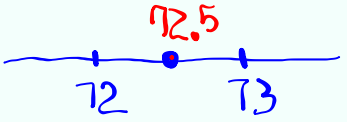
$\frac{\text{Range}}{3} = \frac{42}{3} = 14$

15

class width if we wish to have a Freq. table with 3 classes.

Aug 28-12:35 PM

Class limits	Class BNDRS	Class MP	Class F	Cum. F	Rel. F	% F
58 – 72	57.5 – 72.5	65	7	7	.35	35%
73 – 87	72.5 – 87.5	80	9	16	.45	45%
88 – 102	87.5 – 102.5	95	4	20	.20	20%



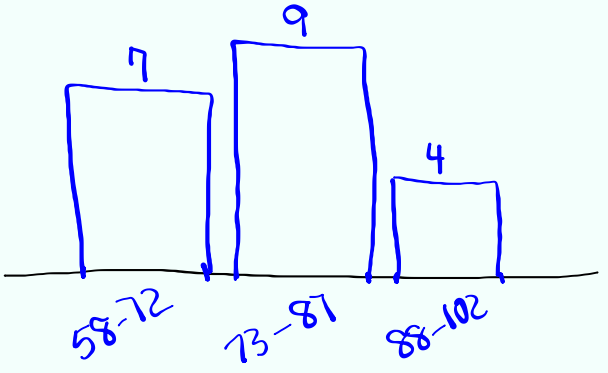
$$\text{Class MP} = \frac{\text{+ class limits}}{2}$$

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

Aug 28-12:44 PM

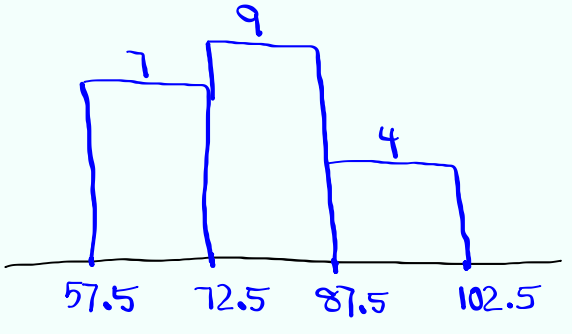
Bar Chart

- Class limits
- Class F



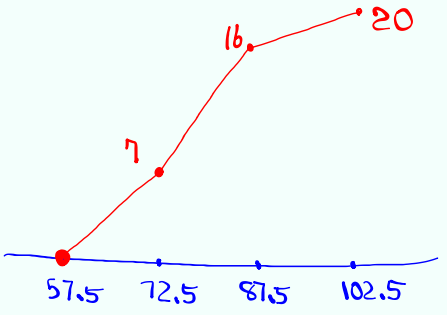
Histogram

- Class BNDRS
- Class F

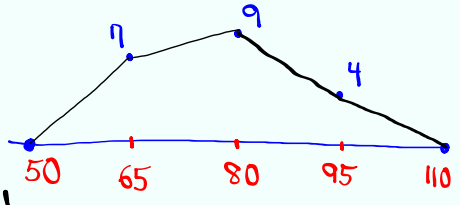


Aug 28-12:58 PM

Ogive
- Class BNDRS
- Cum. F
  - Start at 0 level

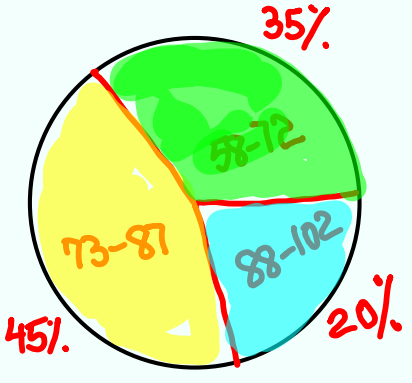


Freq. Polygon
- Class MP ✓
- Class F
- One additional MP on each side
- Start & finish at 0 level



Aug 28-1:02 PM

Pie Chart
- Circle
- % F
- Class limits to name each slice
- % F for size of each slice



Aug 28-1:07 PM

I randomly selected 25 students, Display below is called STEM Plot. It shows their ages.

1	8 9
2	0 3 5 5 5 8
3	2 4 5 5 5 6 9
4	0 1 3 7 8
5	3 6 8 9
6	2

1) $n = 25$

2) Range $= 62 - 18 = 44$

3) Midrange $= \frac{62+18}{2} = 40$

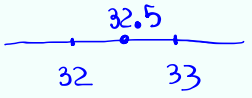
4) Mode $= 25$ & 35

5) Find class width if we wish to have a freq. table with 3 classes.

$$\frac{\text{Range}}{3} = \frac{44}{3} = 14.\overline{6} \qquad \boxed{CW = 15}$$

Aug 28-1:12 PM

class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	% F
18 – 32	17.5 – 32.5	25	9	9	.36	36%
33 – 47	32.5 – 47.5	40	10	19	.40	40%
48 – 62	47.5 – 62.5	55	6	25	.24	24%

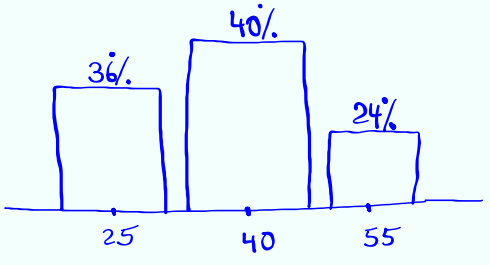


, Class MP $= \frac{\text{+ class limits}}{2}$

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

Bar chart

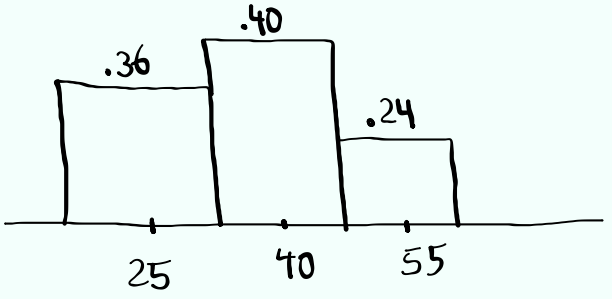
- class MP
- % F



Aug 28-1:20 PM

Histogram

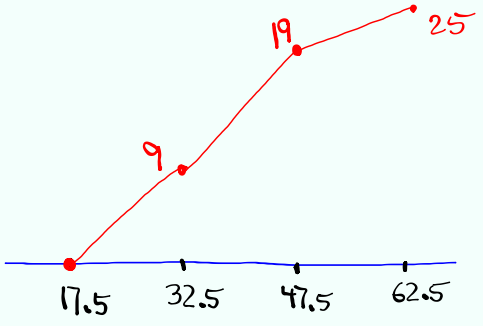
- Class MP
- Rel. F



Aug 28-1:42 PM

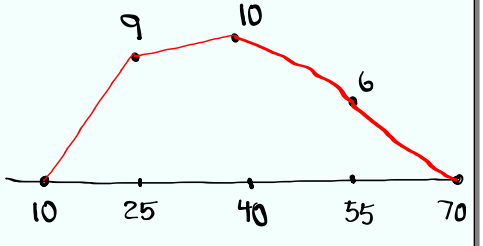
Ogive

- Class BNDRS
- Cum. F.
- Start at 0 level



Freq. Polygon

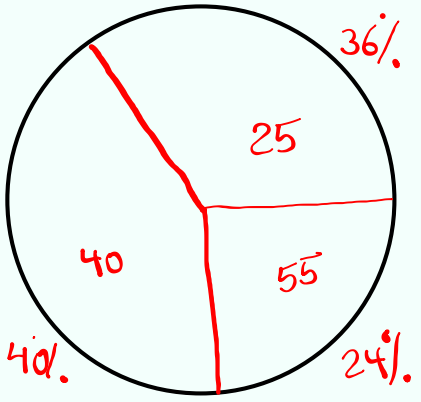
- Class MP
- Class F
- Additional MP
- Start & finish at 0 level



Aug 28-1:44 PM

Pie chart

- Circle
- class MP
  to name each slice
- %. F for size of each slice



Aug 28-1:48 PM

Complete the chart below

class limits	Class BNDRS	class MP	class F	Cum. F	Rel. F	%. F
4 – 10	3.5 – 10.5	7	5	5	.125	12.5%
11 – 17	10.5 – 17.5	14	10	15	.250	25.0%
18 – 24	17.5 – 24.5	21	18	33	.450	45.0%
25 – 31	24.5 – 31.5	28	7	40	.175	17.5%

1) How many classes? 4

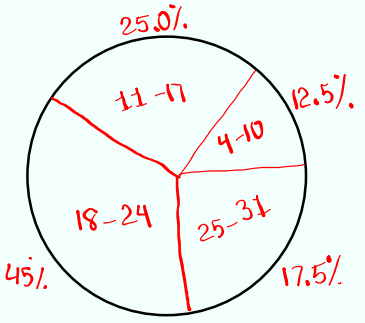
2) Class width? 7

3) Sample Size $n = 40$

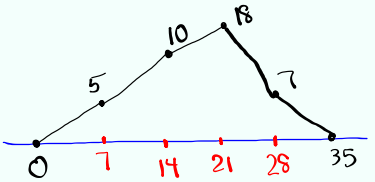
Rel. F: $\frac{f}{n} = \frac{f}{40}$

Aug 28-1:52 PM

Pie chart
- Circle
- class limit
- % F



Freq. Polygon
- Class MP
- class F
- extra MP
- Start & finish @ 0 level



what % of elements were between 11 & 24?

25% + 45% = 70%

Aug 28-2:03 PM

A Sample of 12 had min = 15 and max. = 40.

1) Range = 40 − 15 = 25 2) Midrange: $\frac{40+15}{2}$ = 27.5

3) class width if we wish to have 4 classes.

$\frac{\text{Range}}{4} = \frac{25}{4} = 6.25 \rightarrow$ CW = 7

4) class width if we wish to have 5 classes.

$\frac{\text{Range}}{5} = \frac{25}{5} = 5 \rightarrow$ CW = 6

Aug 28-2:11 PM

Given: $n = 10$, $\sum x = 80$, $\sum x^2 = 640$

1) $\frac{\sum x}{n} = \frac{80}{10} = \boxed{8}$

2) $\frac{n\sum x^2 - (\sum x)^2}{n(n-1)} = \frac{10 \cdot 640 - 80^2}{10(10-1)}$

$= \frac{6400 - 6400}{90} = \frac{0}{90}$

$\emptyset$ ↑ Not Zero

$= \boxed{0}$ ← Zero

3) $\sqrt{\text{Last ans.}}$

$= \sqrt{0} = \boxed{0}$

Aug 28-2:17 PM