Statistics
Fall 2022
Lecture 2

Class QZ 1:

1) what time does this class start?

6:00 AM ✓

2) what kind of calculator are allowed for this class?

TI-83 or TI-84 ✓

3) Evaluate: $\dfrac{52-40}{\frac{5}{\sqrt{16}}} = \dfrac{12}{\frac{5}{4}} = \dfrac{12}{1.25} = 9.6$ ✓

How to organize collected data & graph them: (Sec 3.1)

10 randomly selected quizzes have following Scores:

2 3 4 5 5
5 6 8 9 10

1) Sample Size $n = 10$

2) Min. = 2, Max. = 10

3) Mode: Data element with highest frequency.

5

4) Range = Max − Min = 10 − 2 = 8

5) Midrange = $\frac{\text{Max} + \text{Min}}{2} = \frac{10+2}{2} = \frac{12}{2} = 6$

6) Take Range, divide it by 3 if decimal round up, if whole #, add 1

$\frac{8}{3} = 2.\overline{6} \Rightarrow 3$

7) Take Range, divide it by 2 if decimal round up, if whole #, add 1

$\frac{8}{2} = 4 \Rightarrow 5$

Consider the Sample below:

3, 4, 5, 5, 6, 6, 7, 9

1) Sample Size $n = 8$

2) Min. = 3 & Max = 9

3) Mode = 5 & 6 Bimodal

4) Range = Max − Min
= 9 − 3 = 6

5) Midrange = $\frac{\text{Max}+\text{Min}}{2} = \frac{9+3}{2}$
= 6

6) Divide range by 2, if decimal → Round-up
if whole # → Add 1

$\frac{6}{2} = 3 \Rightarrow 4$

7) Divide range by 4, if decimal → Round-up
if whole # → Add 1

$\frac{6}{4} = 1.5 \Rightarrow 2$

To organize a data set ⇒ we need to build a frequency table.

class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	% F

Each row represents a class.

A combination of different columns help us to do graphing.

1) Bar chart
2) Histogram
3) Ogive
4) Freq. Polygon
5) Pie chart
6) STEM plot
7) Box Plot

Additional info. needed.

Consider the chart below:

class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	% F
2 – 8	1.5 – 8.5	5	4	4	.20	20%
9 – 15	8.5 – 15.5	12	10	14	.50	50%
16 – 22	15.5 – 22.5	19	6	20	.30	30%

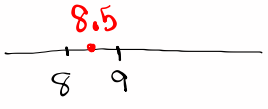
3 Rows ⇒ 3 classes

Class width ⇒ $9-2 = 15-8 = 16-9 = 22-15 = 7$

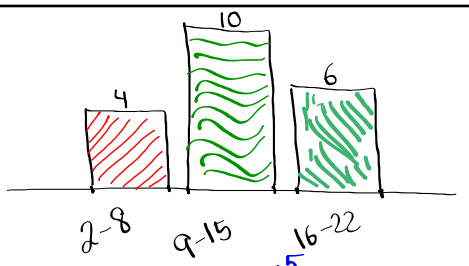
Class MP = $\frac{\text{+ class limits}}{2}$, find first MP, then add CW.

Sample Size n = Last # in Cum. F. Column $n = 20$

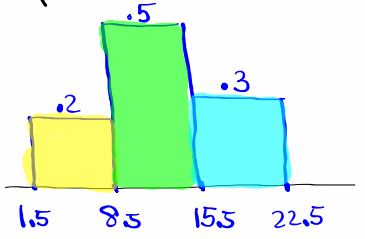
$\text{Rel. F} = \frac{f}{n} = \frac{f}{20}$



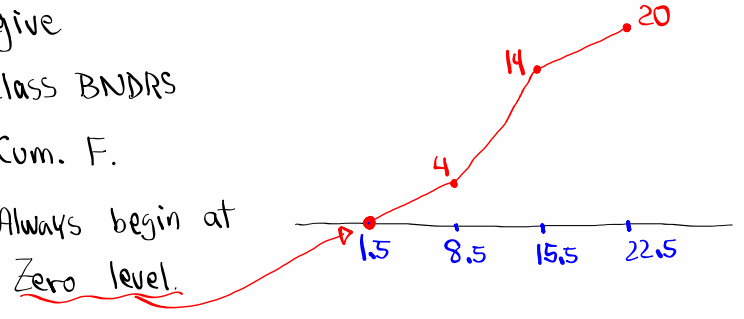
Bar chart
- Class limits
- class F



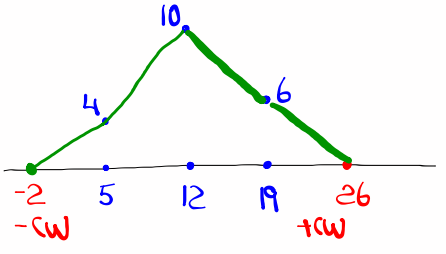
Histogram
- Class BNDRS or class MP
- class F, Rel.F., %F



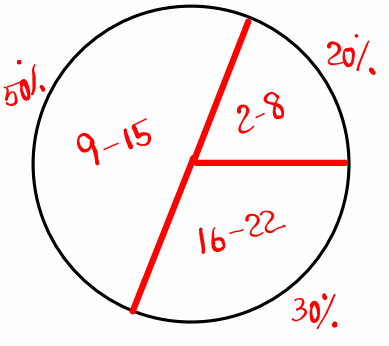
Ogive
- class BNDRS
- Cum. F.
- Always begin at Zero level.



Freq. Polygon
- class MP ✓
- One additional MP on each Side
- class F
- Begin and End at Zero level.



Pie Chart
- Circle
- class limits or class MP
- % F



Complete the Freq. table below:

class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	% F
12 – 21	11.5 - 21.5	16.5	3	3	.12	12%
22 – 31	21.5 - 31.5	26.5	8	11	.32	32%
32 – 41	31.5 - 41.5	36.5	9	20	.36	36%
42 – 51	41.5 – 51.5	46.5	5	25	.20	20%

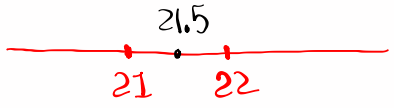
4 classes

CW = 22 - 12 = 32 - 22 = 42 - 32 = 31 - 21 = ... = 10

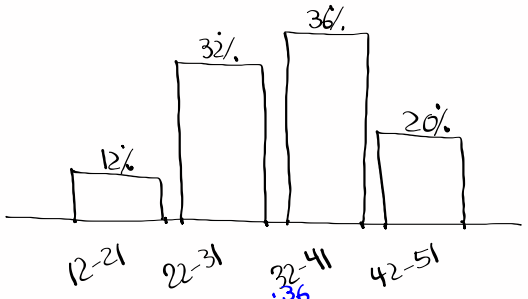
Class MP = $\frac{\text{+ class limits}}{2} = \frac{12+21}{2} = 16.5$

Sample Size $n = 25$

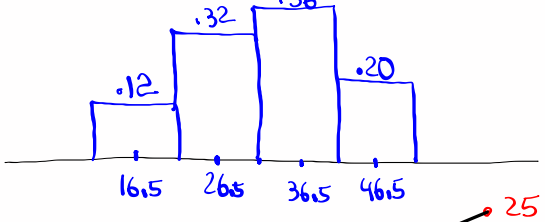
Rel. F = $\frac{f}{n} = \frac{f}{25}$



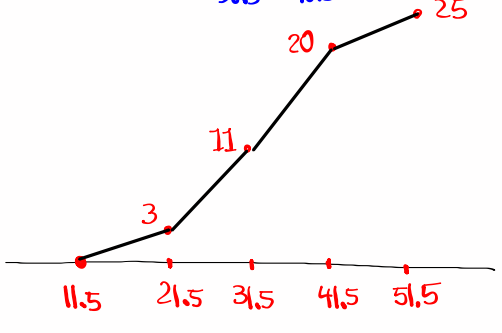
Bar chart
- class limits
- % F



Histogram
- class MP
- Rel. F.

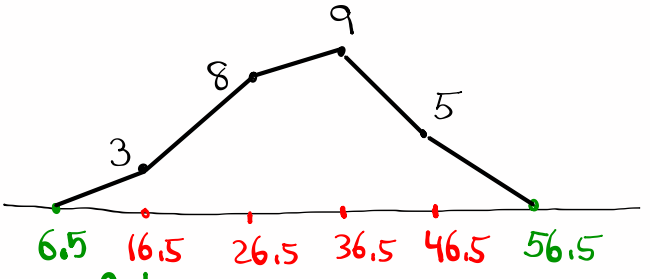


Ogive
- class BNDRS
- Cum. F.
- Begin at 0.



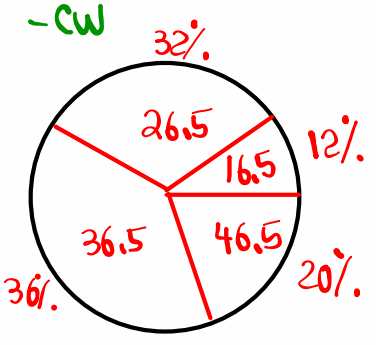
Freq. Polygon

- Class MP
- Extra MP, one on each side
- Class F
- Begin & End @ 0 level



Pie chart

- Circle
  - Class MP
  - % F



Now making Freq. table from Scratch:

Consider the raw data below

15	18	20	20	24
25	28	28	28	29
30	32	35	39	40
43				

1) $n = 16$

2) Min = 15 Max = 43

3) Range = Max − Min = 28

4) Make a Freq. table with 3 classes.

Class width = $\frac{\text{Range}}{\#\text{ classes}}$

If decimal → Round-up

If whole # → Add 1

Class width = $\frac{28}{3} = 9.\overline{3}$

CW = 10

15 18 20 20 24
25 28 28 28 29
30 32 35 39 40
43

$n = 16$ CW = 10

Make STEM plot
"Data must be Sorted"

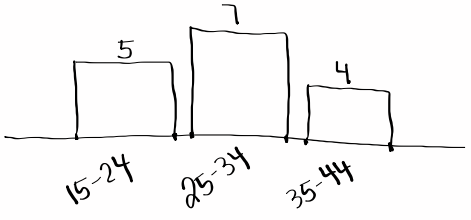
1	5 8
2	0 0 4 5 8 8 8 9
3	0 2 5 9
4	0 3

Class limits	Class BNDRS	Class MP	Class F	Cum. F	Rel. F	% F
15 - 24	14.5 - 24.5	19.5	5	5	.313	31.3%
25 - 34	24.5 - 34.5	29.5	7	+ 12	.438	43.8%
35 - 44	34.5 - 44.5	39.5	4	16	.250	25.0%

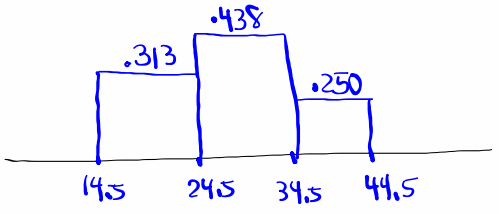
Rel. F = $\frac{f}{n} = \frac{f}{16}$

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

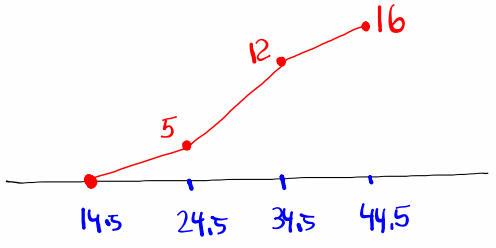
Bar chart
- Class limits
- Class F



Histogram
- Class BNDRS
- Rel. F.

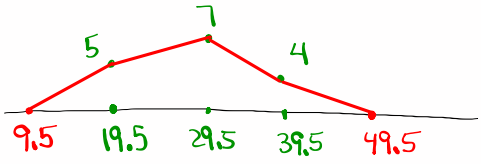


Ogive
- class BNDRS
- Cum. F.
- Start at 0 level



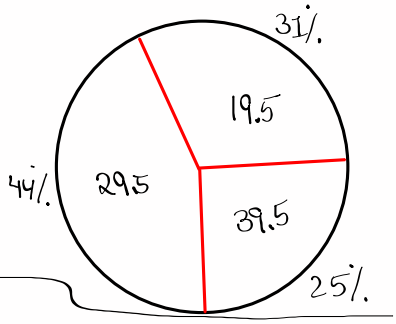
Freq. Polygon

- Class MP
- one Extra MP on each Side
- Class F
- Begin & End at 0 level



Pie chart

- Circle
- % F (Round to whole %)
- Class MP



SG 3 & SG 4

Class QZ 2

Consider the Sample 2, 4, 5, 5, 9

1) Sample Size n

$\boxed{n = 5}$

2) Find $\sum x = 2 + 4 + 5 + 5 + 9 = \boxed{25}$

Add all data elements

3) Find $\sum x^2 = 2^2 + 4^2 + 5^2 + 5^2 + 9^2 = 4 + 16 + 25 + 25 + 81 = \boxed{151}$

Square each data elements, then add.