Statistics

Lecture 2

Class QZ 1:

1) what kind of calculator do we need for this class?

TI-83 or TI-84

2) Simplify $\frac{8 \cdot 200 - 40^2}{8(8-1)} = \frac{1600 - 1600}{8 \cdot 7} = \frac{0}{56} = 0$

SG 3.1

We collect data,

we organize data in a table called frequency table.

we draw some graphs.

I randomly selected 20 exams, and here are the scores:

54 58 60 65 69
70 70 75 76 78
78 80 82 88 88
90 95 95 99 100

1) Sample Size $n = 20$

2) Min. = 54, Max. = 100

3) Range = Max − Min
$= 100 - 54 = 46$

4) Midrange $= \frac{\text{Max} + \text{Min}}{2} = \frac{100+54}{2} = 77$

5) Mode: 70, 78, 88, 95 Multimodal

To make a Freq. table, we need class width.

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

If decimal $\Rightarrow$ Round-up

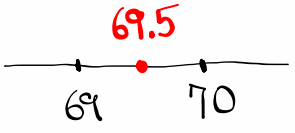
If whole # $\Rightarrow$ Add 1

Suppose we want 3 classes

CW $= \frac{\text{Range}}{3} = \frac{46}{3}$
$= 15.\overline{3}$

CW = 16

Class limits	class BNDRS	Class MP	class F	Cum. F	Rel. F	%F
54 – 69	53.5 – 69.5	61.5	5	5	.25	25%
70 – 85	69.5 – 85.5	77.5	8	13	.40	40%
86 – 101	85.5 – 101.5	93.5	7	20	.35	35%



, Class MP $= \frac{\text{class limits}}{2}$, Rel. F $= \frac{F}{n} = \frac{F}{20}$

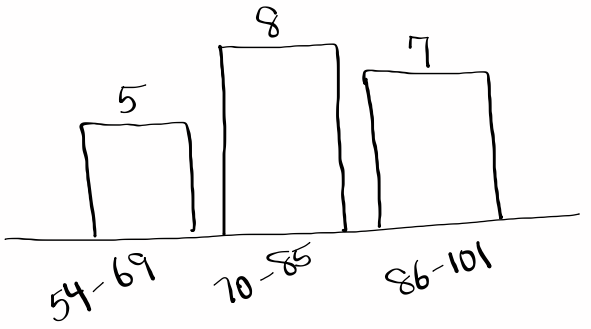
1) Bar chart 2) Histogram 3) ogive

4) Freq. Polygon 5) Pie chart 6) Stem Plot

7) Box Plot

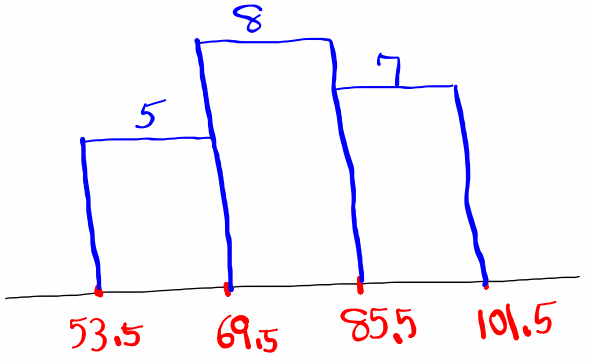
Bar Chart

- Class limits
- Class F



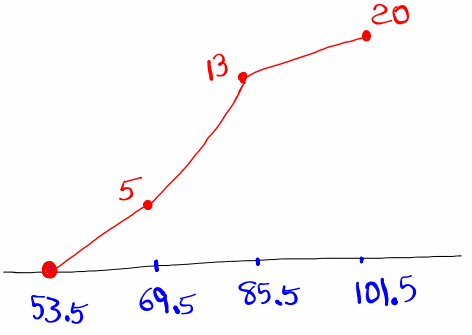
Histogram

- Class BNDRS
- Class F



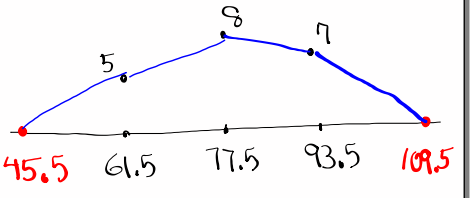
Ogive

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



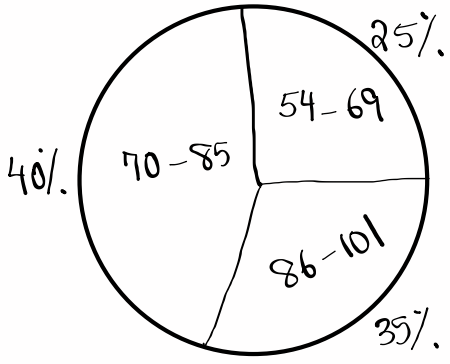
Freq. Polygon

- Class MP
- Class F
- One extra MP on each side
- Starts & Ends at 0 level



Pie chart

- Circle
- class limits
- % F



STEM Plot

- Data must be Sorted from Smallest to largest

5	48
6	059
7	005688
8	0288
9	0559
10	0

Class QZ 2

1) What are the types of quantitative data?

Discrete and Continuous

2) Given: Min=20 and Max=100, find

a) Range = Max − Min
= 100 − 20
= 80

b) Midrange = $\frac{\text{Max} + \text{Min}}{2}$
= $\frac{100 + 20}{2}$
= 60

I randomly Selected 25 students, and here are their ages:

18 19 20 20 25 25
25 28 30 32 34 35
35 35 37 38 39 40
42 43 46 48 50 50
54

1) $n = 25$

2) Range $= 54 - 18 = 36$

3) Midrange $= \frac{54+18}{2} = 36$

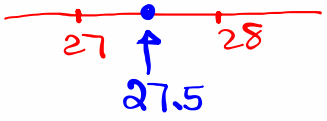
4) Mode: 25 & 35
Bimodal

5) Class width if we wish to have 4 classes:

$$CW = \frac{\text{Range}}{\#\text{ of classes}} = \frac{36}{4} = 9$$

$CW = 10$

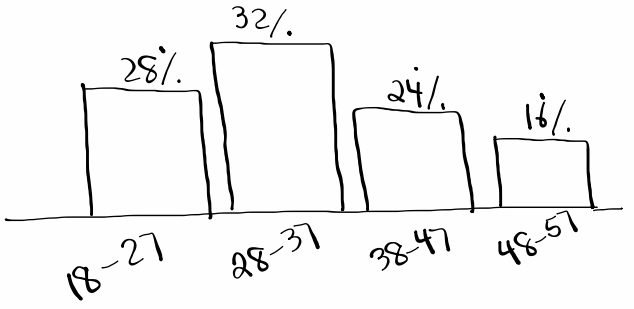
Class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	% F
18 – 27	17.5 – 27.5	22.5	7	7	.28	28%
28 – 37	27.5 – 37.5	32.5	8	15	.32	32%
38 – 47	37.5 – 47.5	42.5	6	21	.24	24%
48 – 57	47.5 – 57.5	52.5	4	25	.16	16%



Class MP $= \frac{18+27}{2}$, Rel. F $= \frac{F}{n} = \frac{F}{25}$

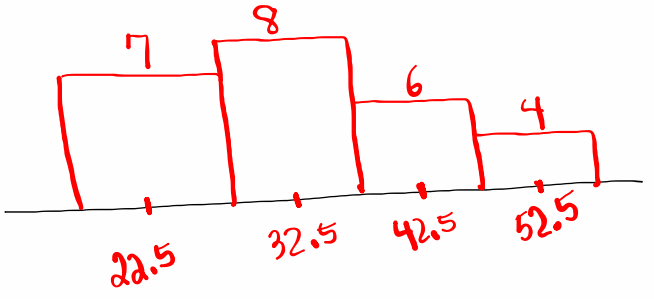
Bar chart

- class limits
- % F



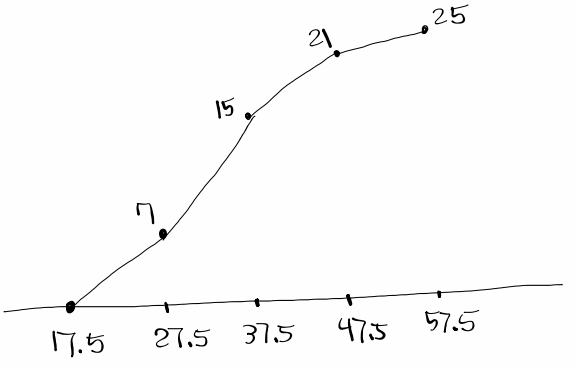
Histogram

- class MP
- class F



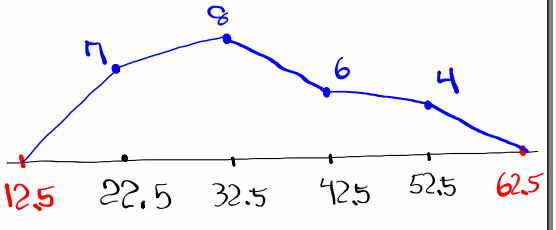
Ogive

- class BNDRS
- Cum. F



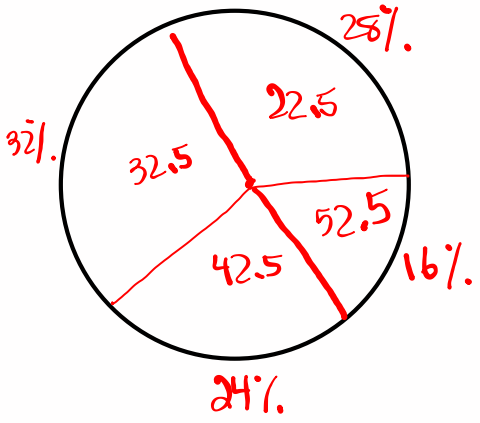
Freq. Polygon

- class MP
- class F
- Extra MP, one on each side



Pie chart

- class MP
- % F



STEM Plot

1	89
2	005558
3	024555789
4	02368
5	004

A data set has a range of 35.
Find class width if we wish to have

1) 4 classes

$CW = \frac{35}{4} = 8.75 \rightarrow \boxed{CW = 9}$

2) 5 classes

$CW = \frac{35}{5} = 7 \rightarrow \boxed{CW = 8}$

Consider the Sample below

2, 4, 4, 4, 10

1) $n = 5$

2) Range $= 10 - 2 = 8$

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

3) mode $= 4$

4) $\sum x = 2+4+4+4+10 = \boxed{24}$

5) $\sum x^2 = 2^2+4^2+4^2+4^2+10^2 = \boxed{152}$

6) $\frac{\sum x}{n} = \frac{24}{5} = \boxed{4.8}$

7) $\frac{n\sum x^2 - (\sum x)^2}{n(n-1)} = \frac{5 \cdot 152 - 24^2}{5(5-1)} = \frac{184}{20} = \boxed{9.2}$

8) $\sqrt{\text{Last answer}} = 3.03$

Round to 1-decimal $\approx \boxed{3.0}$

Consider the Sample below

3 3 5 5 7 7

1) $n = \boxed{6}$

2) Range $= 7 - 3 = \boxed{4}$

3) Midrange $= \frac{7+3}{2} = \boxed{5}$

4) mode $\boxed{\text{None}}$

5) $\sum x = 3+3+5+5+7+7 = \boxed{30}$

6) $\sum x^2 = 3^2+3^2+5^2+5^2+7^2+7^2 = \boxed{166}$

7) $\frac{\sum x}{n} = \frac{30}{6} = \boxed{5}$

8) $\frac{n\sum x^2 - (\sum x)^2}{n(n-1)} = \frac{6 \cdot 166 - 30^2}{6(6-1)} = \frac{96}{30} = \boxed{3.2}$

9) $\sqrt{\text{Last answer}} = 1.78885$

Round to 2-decimal Places $\approx \boxed{1.79}$

Given: $n=8$, $\sum x=36$, $\sum x^2=204$

1) $\frac{\sum x}{n} = \frac{36}{8} = \boxed{4.5}$

2) $\frac{n\sum x^2-(\sum x)^2}{n(n-1)} = \frac{8\cdot 204 - 36^2}{8(8-1)} = \frac{336}{56} = \boxed{6}$

3) $\sqrt{\text{Last Answer}} = \sqrt{6}$ 2.449....

Round to whole # $\rightarrow \approx \boxed{2}$

Class QZ 3

Complete the chart below

class BNDRS	class F	Cum. F
12.5 – 20.5	3	3
20.5 – 28.5	7	10
28.5 – 36.5	4	14

Draw ogive. clearly label.