

Statistics Lecture 1



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What is Statistic ?

It is about collecting information (Data), organize them, graph them, do certain calculations, and draw conclusion from them to make predictions.

Two Branches:

- 1) Descriptive: Collect data, organize, graph, and do calculations.
- 2) Inferential: what we learn from data to draw conclusion and make predictions.

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<p>Population (Entire field)</p> <p>Parameter</p>	<p>VS.</p>	<p>Sample (Randomly Selected from Population)</p> <p>Statistic</p>
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Average age of all students at college is 28 yrs
 Parameter

Median income for 20 selected nurses
in So. CAL. ^{Statistics} is \$6000.

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<p>Data (information)</p>	}	<p>1) Qualitative (Non-Numerical)</p>	<p>eye color Brand of cars P or NP Grade</p>
		<p>2) Quantitative (Numerical)</p>	<p>1) Discrete Countable</p> <p>2) Continuous Measurable</p>

of students → Discrete

Room temp. → Continuous

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Level of measurements:

- 1) Nominal Red, white, Blue
Toyota, Ford, Chevy, Nissan
- 2) Ordinal Small, Med., Large
Dress/shirt Sizes
4 5 6 7 8
- 3) Ratio Small (100€) Large (200€)
- 4) Interval → Range of values
90% - 100% → A
50€ - 9.990€ → \$3 worth of stamps

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How to collect data:

- 1) Systematic : Every kth item Selected.
every 10th item on assembly line is selected for quality check.
- 2) Stratified : Divide into groups,
Select few from each group
Males → Select 4
Females → Select 6

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- 3) Cluster: Divide into groups
 Select few groups,
 Survey all members of
 selected groups.

College offers 2000 sections of classes.
 Select 40 sections, and ask all students
 from these selected sections to complete
 a student survey.

- 4) Random / Convenience

The least reliable method to
 collect data

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Observation	vs	Experiment
when we observe changes with no action taken.		when action taken to see the result.

Some calculation:

Min. = 20 and Max = 100.

Compute

1) Max - Min = $100 - 20 = 80$

2) $\frac{\text{Max} + \text{Min}}{2} = \frac{100 + 20}{2} = \frac{120}{2} = 60$

~~$(100 + 20) \div 2 = 110$~~

$\rightarrow 60$ 2) 60

3) $\left(\frac{\text{Max} - \text{Min}}{4}\right)^2 = \left(\frac{80}{4}\right)^2$

$= 20^2 = 400$ 3) 400

SG 2

www.mymathclasses.com

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I randomly selected 20 students, here are their ages:

18 19 20 20 24

1) Sample Size
 $n = 20$

25 25 25 28 30

2) Min. = 18, Max. = 50

30 32 32 33 36

3) Range = Max - Min

39 40 42 45 50

$= 50 - 18 = 32$

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

$= \frac{50 + 18}{2} = \frac{68}{2} = 34$

5) Mode 25

I want to organize this sample into a freq. table with 3 classes, ^{groups}

class width = $\frac{\text{Range}}{\# \text{ classes}} = \frac{32}{3} = 10.\bar{6}$

If decimal \rightarrow Round-up

CW = 11

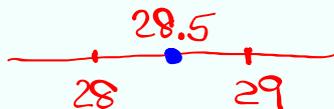
If whole # \rightarrow Add 1

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class limits	class BNDrs	class MP	class F	Cum. F	Rel. F	%F
18 - 28	17.5 - 28.5	23	9	9	.45	45%
29 - 39	28.5 - 39.5	34	7	16	.35	35%
40 - 50	39.5 - 50.5	45	4	20	.20	20%

CW = 11

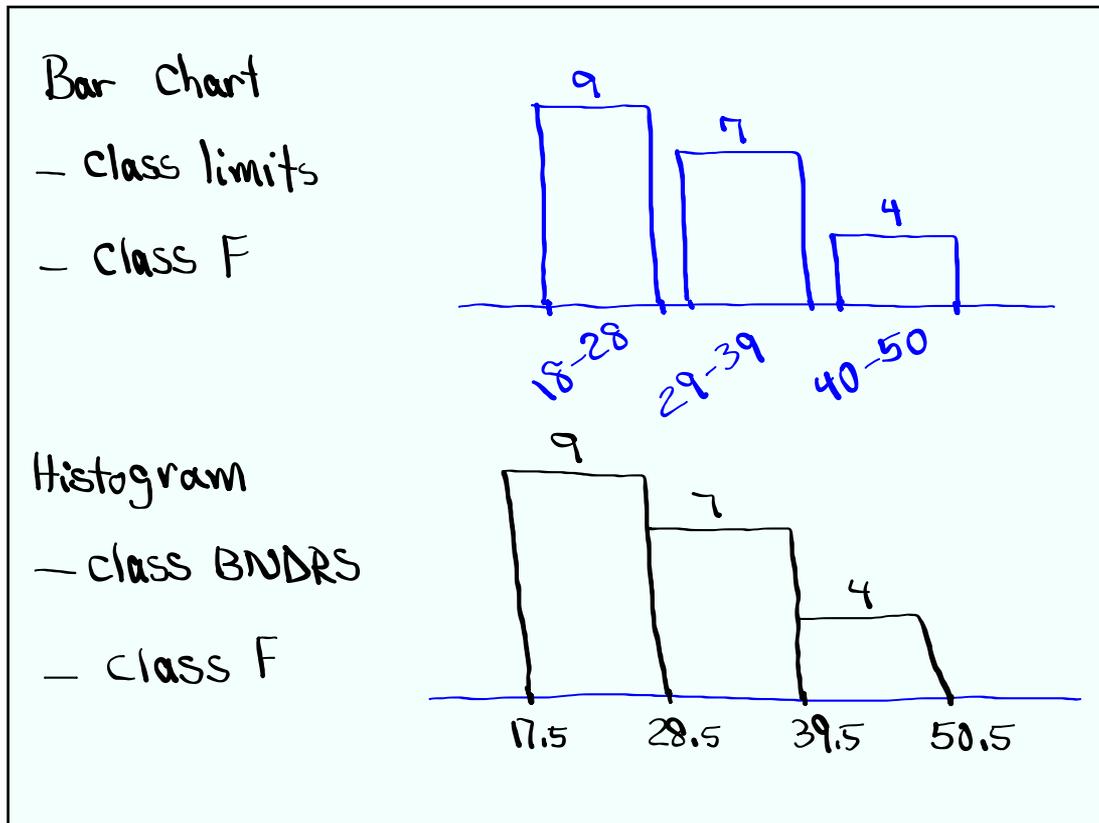
class MP = $\frac{\text{class limits}}{2}$



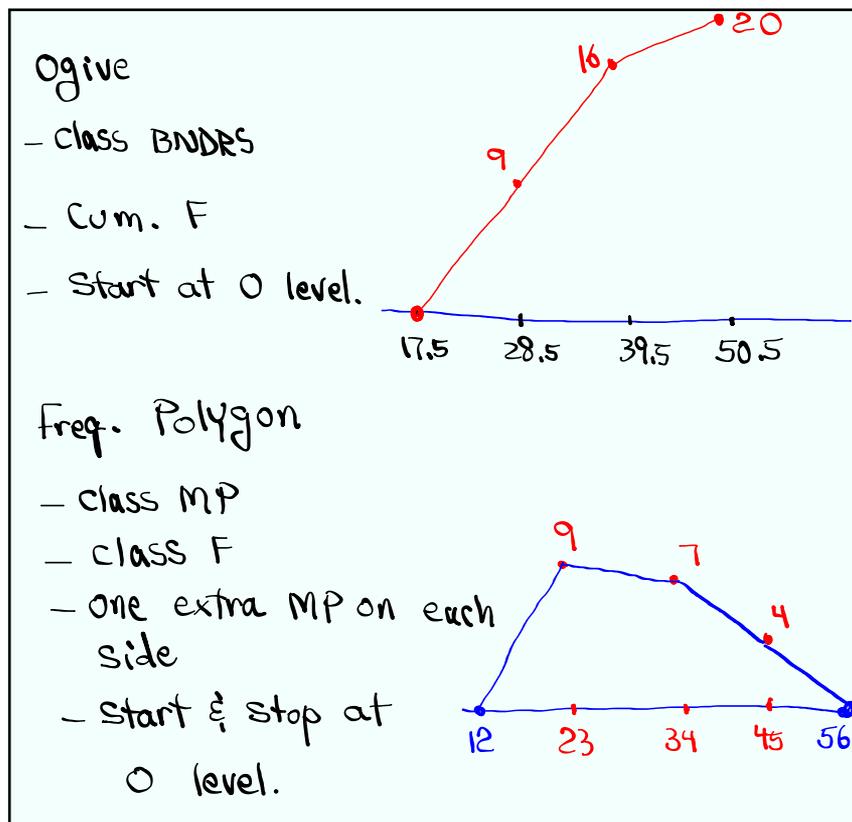
n

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

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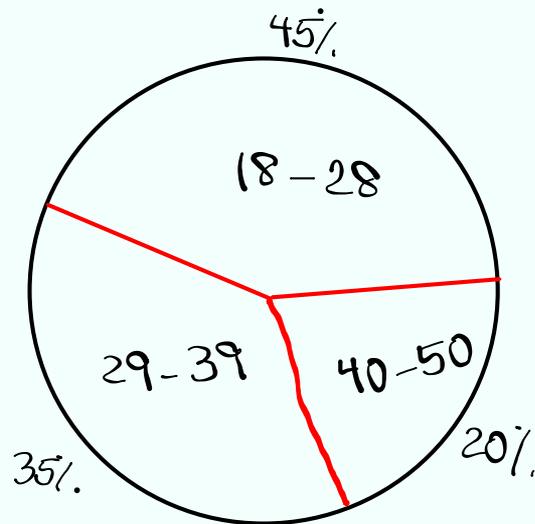
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Pie Chart

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



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I randomly selected 25 exams. Here are the scores:

52 55 58 60 63

1) $n = 25$

64 66 68 70 72

2) Range = $100 - 52 = 48$

75 75 75 78 80

3) Midrange = $\frac{100 + 52}{2}$
= $\boxed{76}$

83 86 86 86 89

4) Mode = 75 & 86

90 92 98 100 100

Bimodal

5) Median $\boxed{75}$

6) Find class width if we wish to make a freq. table with 4 classes.

$$CW = \frac{\text{Range}}{4} = \frac{48}{4} = 12 \rightarrow \boxed{CW = 13}$$

↖ whole + 1

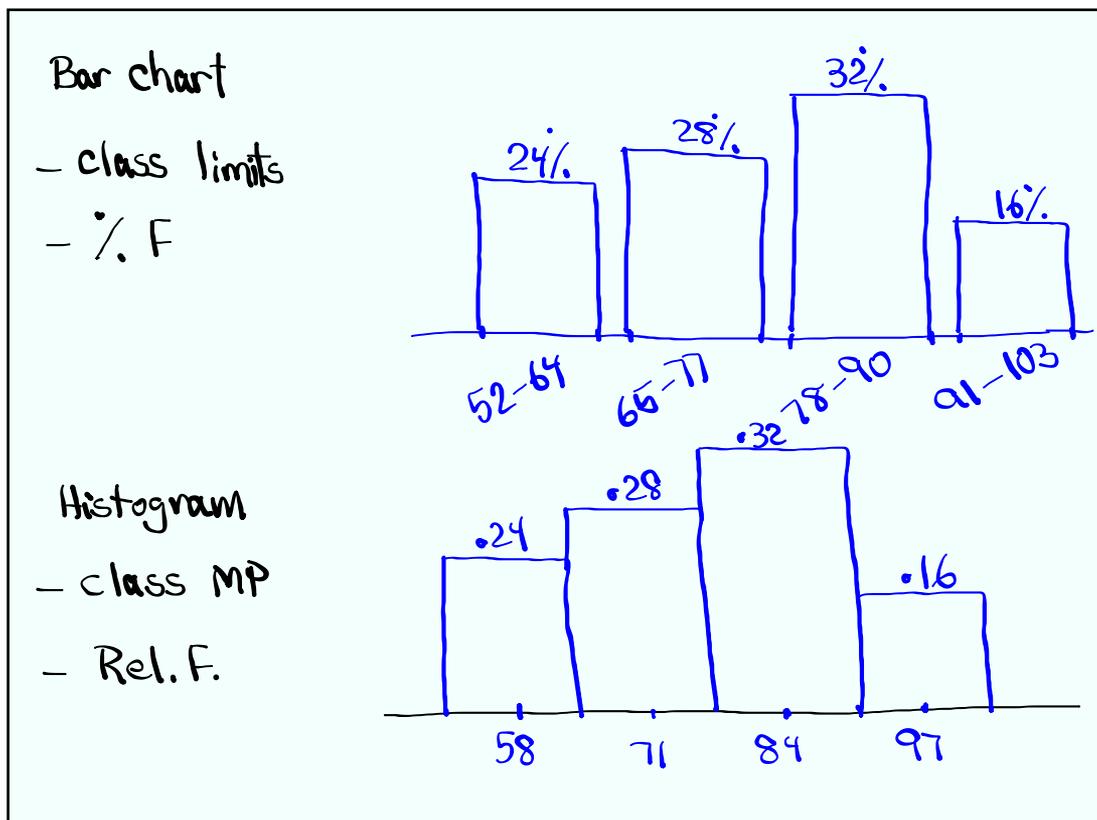
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class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	%F
52 - 64	51.5 - 64.5	58	6	6	.24	24%
65 - 77	64.5 - 77.5	71	7	13	.28	28%
78 - 90	77.5 - 90.5	84	8	21	.32	32%
91 - 103	90.5 - 103.5	97	4	25	.16	16%

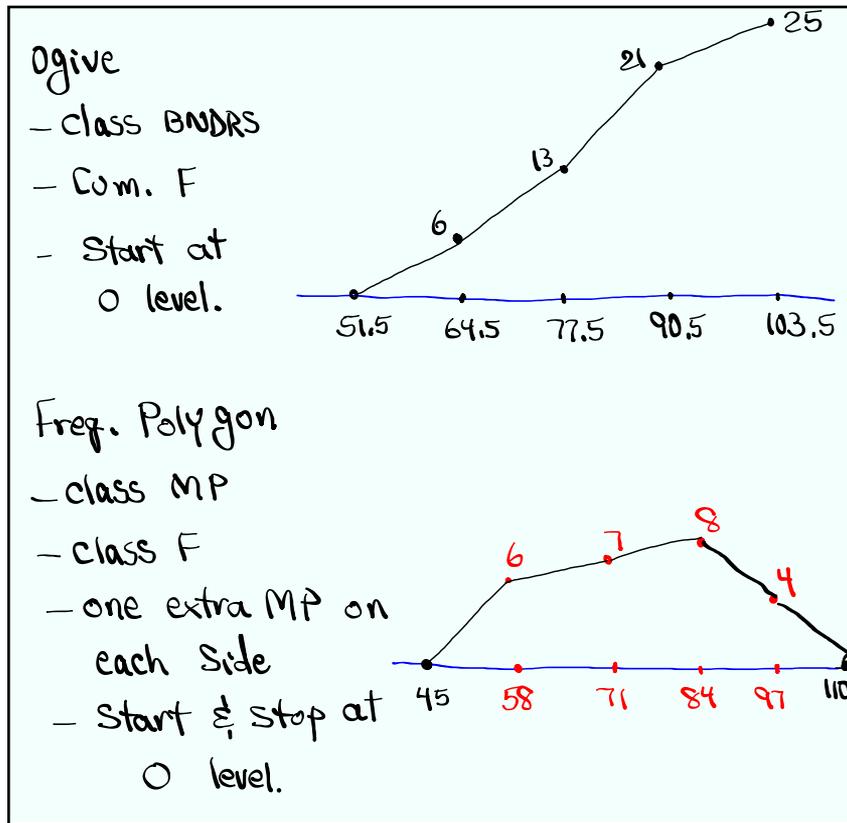
$CW = 13$
 $class\ MP = \frac{+class\ limits}{2} = \frac{52+64}{2} = \frac{116}{2} = 58$
 $Rel.\ F = \frac{f}{n} = \frac{f}{25}$

what % of Scores are between 65 & 90?
 inclusive.
 $28\% + 32\% = 60\%$

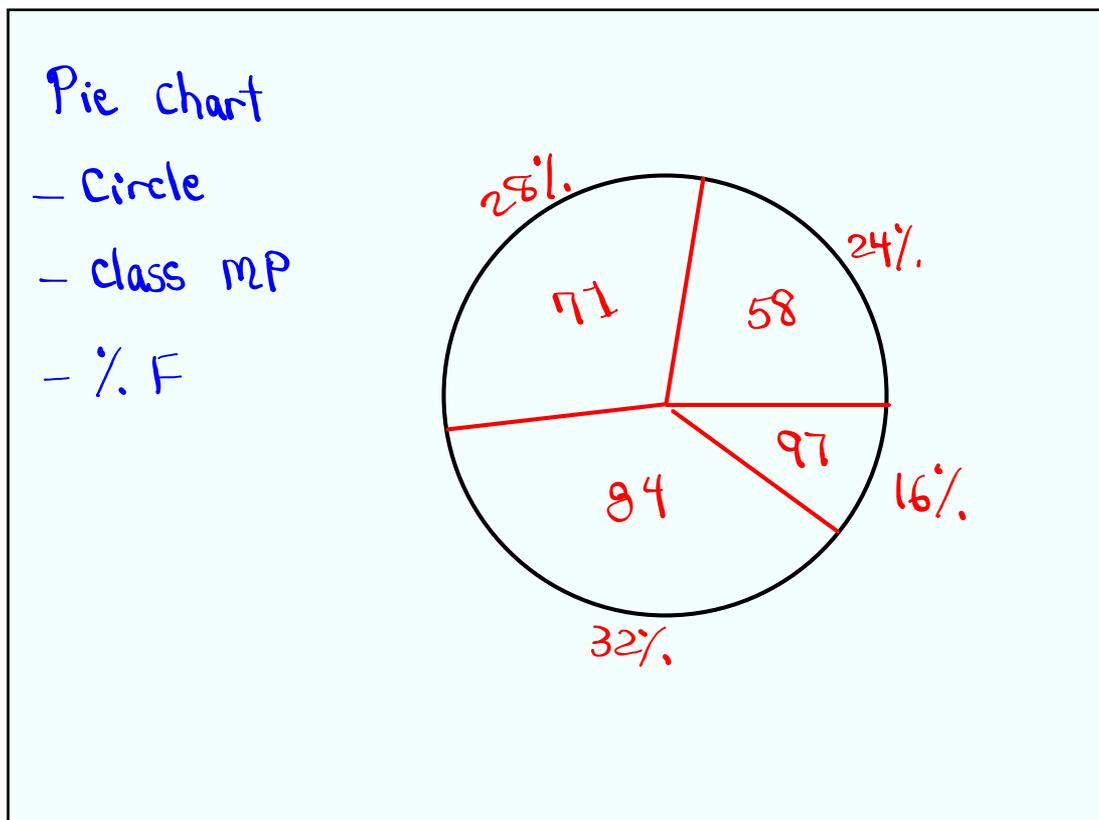
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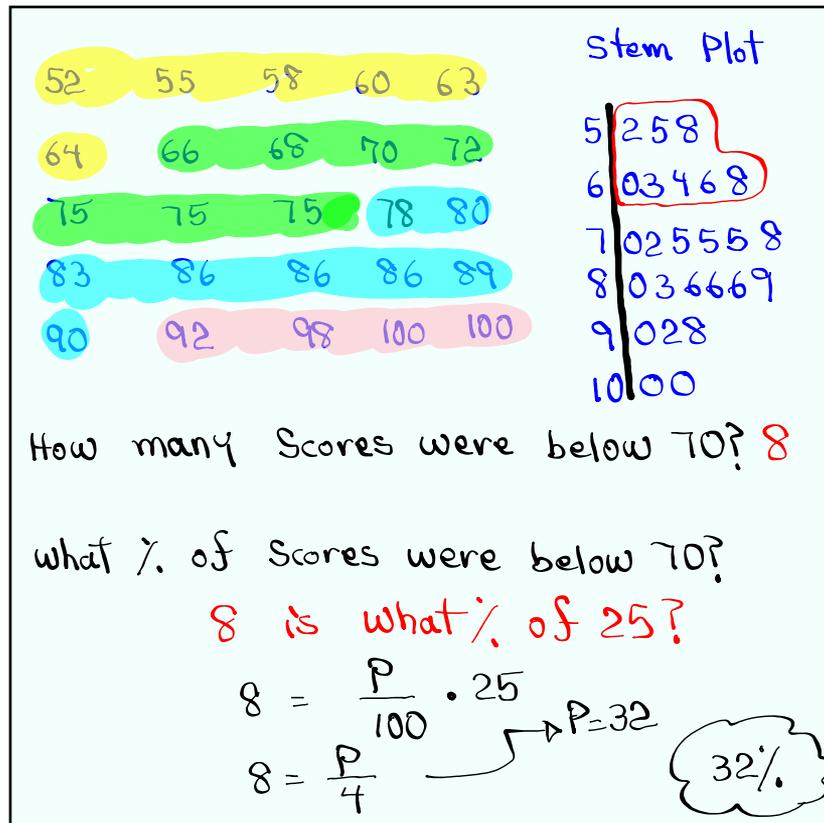
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