

Statistics Lecture 1



Feb 19-8:47 AM

Basic Math Review SG 1

1) Simplify $\frac{75}{120}$

$$\frac{75}{120} = \frac{5 \cdot 15}{3 \cdot 40} = \frac{5}{8}$$

1) $\frac{5}{8}$

2) Write 2.5% in decimal & Reduced fraction

$$2.5\% = 2.5(.01) = .025$$

$$2.5\% = \frac{2.5}{100}$$

2) $\frac{.025}{1/40}$

TI-83 or TI-84

$$2.5 \div 100 \quad \text{Math} \quad [1] \rightarrow \text{frac} \quad \text{Enter} \quad \frac{1}{40}$$

3) Write 12300000 in Scientific notation

$$1.23 \times 10^7$$

$N \times 10^n$
 \uparrow any integer
 $1 \leq N < 10$

3) 1.23×10^7

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4) Write 6.5×10^{-4} in standard notation.
S.N.

0.00065

4) 0.00065

optional

5) 6% of 150 students had a job.
 How many of them had a job?

what is 6% of 150?

$$x = .06(150) \quad \boxed{x=9}$$

5) 9

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Given $\boxed{2, 3, 5, 5, 10}$ \rightarrow 5 numbers $\rightarrow n=5$

$$\sum x = 2 + 3 + 5 + 5 + 10 = \boxed{25}$$

↑
 Summation of x

$$\sum x^2 = 2^2 + 3^2 + 5^2 + 5^2 + 10^2 = \boxed{163}$$

$$\begin{aligned} \text{Find } \frac{n \sum x^2 - (\sum x)^2}{n(n-1)} &= \frac{5 \cdot 163 - 25^2}{5(5-1)} \\ &= \frac{190}{20} = \boxed{\frac{19}{2}} = \boxed{9.5} \end{aligned}$$

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8) Simplify

$$a) \frac{32 - 26}{\frac{16}{\sqrt{25}}} = \frac{6}{\frac{16}{5}} = \frac{6}{3.2}$$

whole $\rightarrow 2$ 1-dec. $\rightarrow 1.9$ 2-dec. $\rightarrow 1.88$ 8a) 1.875

$$b) 1.96 \cdot \sqrt{\frac{(.4)(.6)}{24}}$$

$$= 1.96 \cdot \sqrt{.01} = \boxed{.196}$$

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A deck of playing cards with 40 cards has
10 Red & 8 Face cards.

1) What percent of cards are red color?

10 is what % of 40?

$$10 = \frac{P}{100} \cdot 40 \rightarrow P = 25$$

1) 25%

2) what percent ¹⁰⁰ of cards are not face cards?

8 Face cards

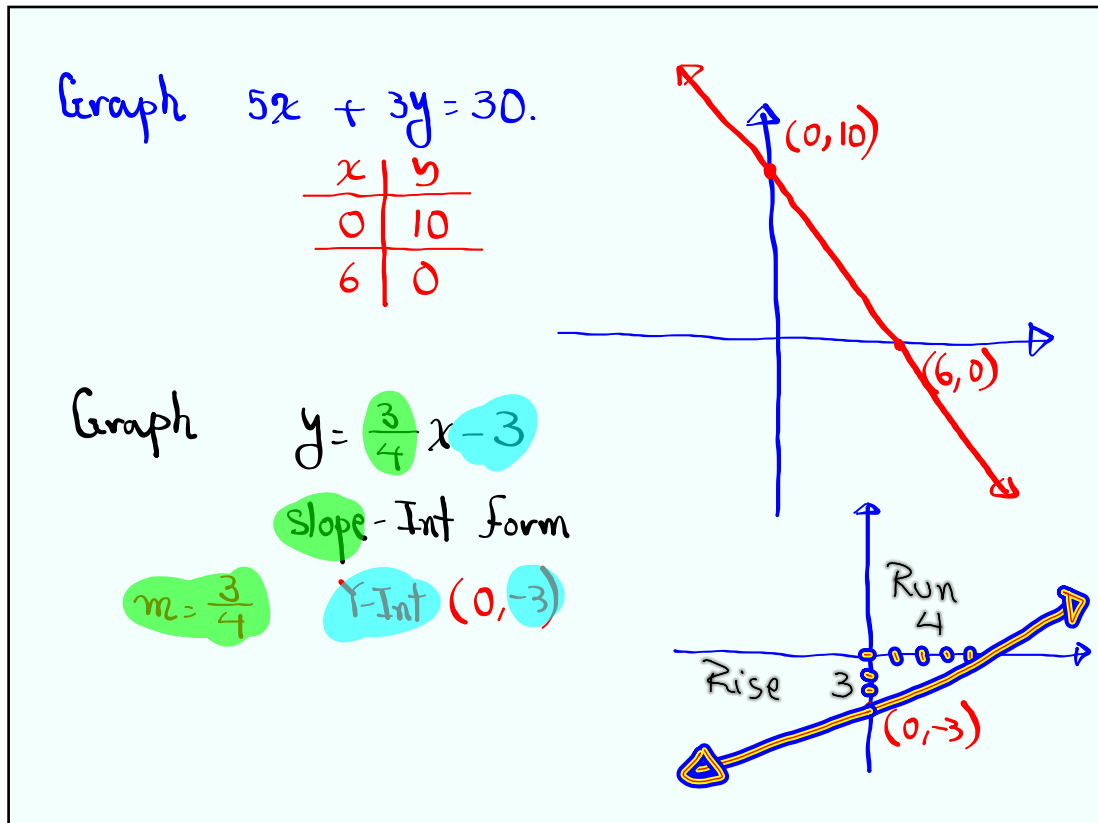
32 Face cards

32 is what percent of 40?

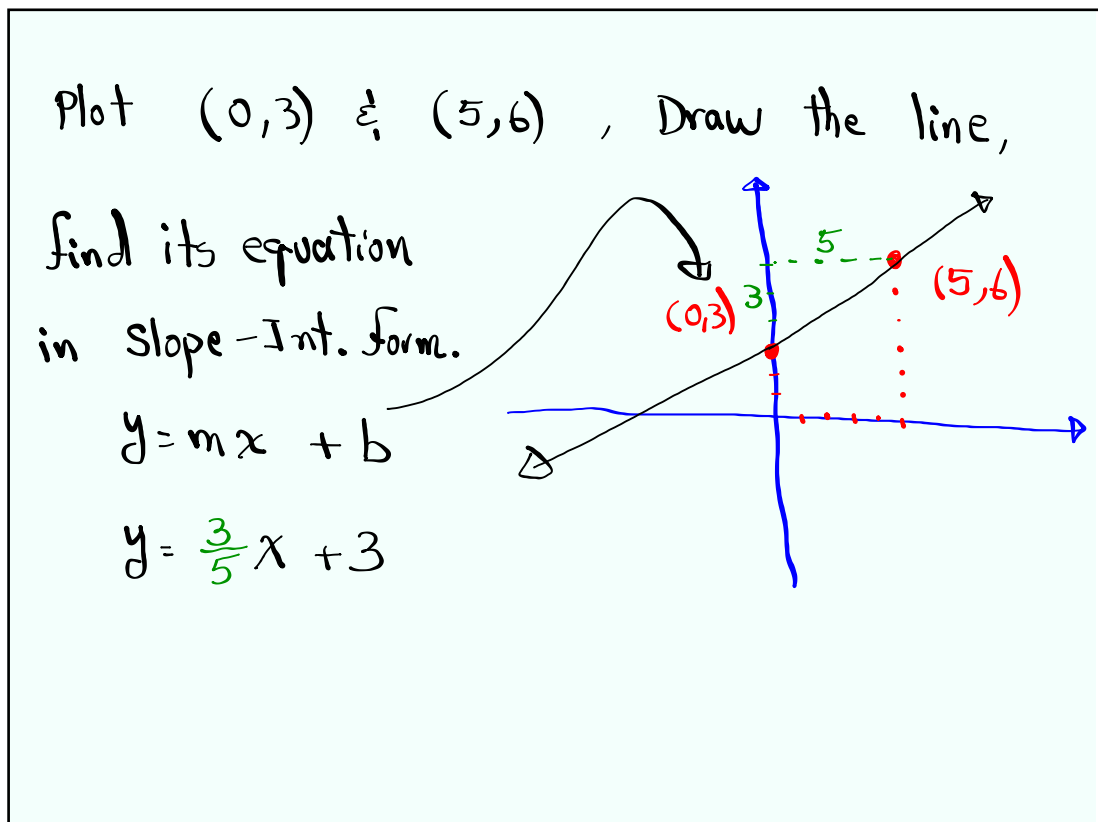
$$\frac{32}{40} \cdot 100 = 80$$

2) 80%

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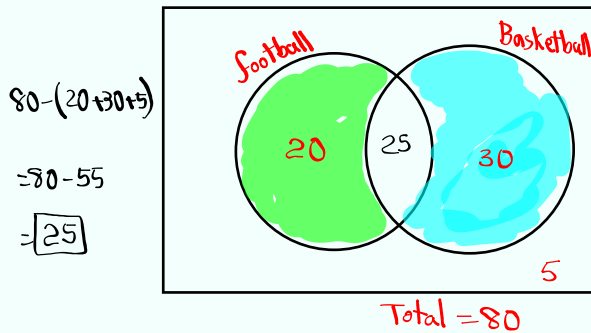


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I surveyed 80 students.
 20 were fan of football only.
 30 " " " basketball only.
 5 were not fan of these sports.
 Organize this in a Venn Diagram.



SG 1 ✓

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what is statistics?

SG 2

It is the science of study data.
 (Information)

we collect data, we organize them,
 we graph them, we do certain computations,
 and we draw conclusion with some level of
 confidence and make predictions.

Two Branches:

1) Descriptive : collect data, organize, graph,
 compute, - - -

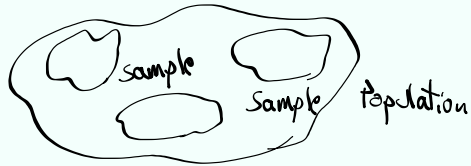
2) Inferential : To draw conclusion from
 Descriptive Statistics.

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Sample vs Population

Population : Entire field of interest

Sample : randomly selected from population



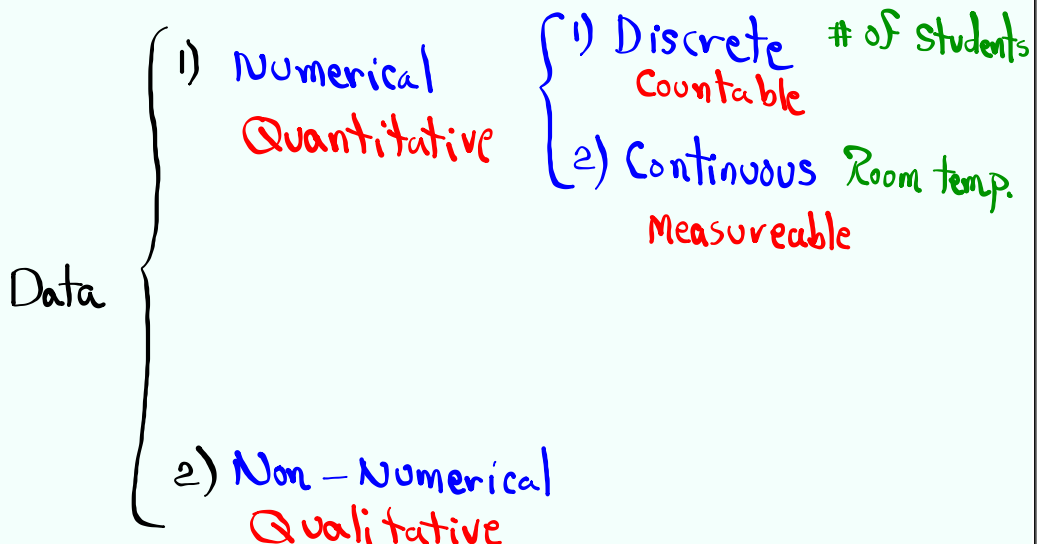
Population \longleftrightarrow Parameter

Sample \longleftrightarrow Statistic

Average income of all students is \$2000/mo
Parameter

Average exam scores of 15 randomly selected students is 88.
Statistic

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Level of measurements:

- 1) Nominal → Names (Qualitative)
Eye color, Car Brands, ...
- 2) Ordinal → order is meaningful
Small, Med., Large
- 3) Interval → Range of values
Distance from A to B.
Room temp.
- 4) Ratio
↳ when ratio is meaningful.
Small drink (10 OZ)
Large drink (20 OZ)

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Sampling Methods:

- 1) Systematic → every k th item selected.
every 5th call is recorded.
- 2) Stratified → Divide into groups,
Select few from each group.
- 3) Cluster → Divide into groups,
Some groups are selected, now
Collect data from all
members of
selected groups.
- 4) Convenience & Random
No formula or pattern
(Least Reliable)

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Cal Poly Pomona

Fresh.	(100)	
Soph.	(150)	<u>Stratified</u>
Jr.	(75)	
Sr.	(50)	
Graduate Students	(25)	

Mt. SAC offers 400 sections of classes during winter 2025. Cluster

Select 50 sections, then ask all students in these selected sections to do student survey.

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Observation	VS	Experiment
observe outcome without taking any action.		observe changes/outcome after taking actions.

SG 2 ✓

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A data Set has a min. = 15 and max. = 65

Compute

$$1) \text{ Max} - \text{Min} \\ = 65 - 15 = \boxed{50}$$

$$2) \frac{\text{Max} + \text{Min}}{2} \\ = \frac{65 + 15}{2} = \boxed{40}$$

$$3) \frac{\text{Max} - \text{Min}}{4} = \frac{50}{4} = \boxed{12.5}$$

$$4) \frac{(\text{Max} - \text{Min})^2}{12} = \frac{50^2}{12} \\ = 208.\bar{3}$$

$$5) \left(\frac{\text{Max} - \text{Min}}{4} \right)^2 = \left(\frac{50}{4} \right)^2 = 12.5^2 = \boxed{156.25}$$

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I randomly selected 5 quizzes. Here are
the Score 2, 8, $\boxed{10, 10}$, 16.

SG 3

$$1) \text{ Sample Size } n = 5$$

$$2) \text{ Min.} = 2, \text{ Max.} = 16$$

$$3) \text{ Range} = \text{Max} - \text{Min} = 16 - 2 = 14$$

$$4) \text{ Midrange} = \frac{\text{Max} + \text{Min}}{2} = \frac{16 + 2}{2} = 9$$

Possible Calc. error

$$16 + 2 \div 2 = \boxed{17} \times$$

$$(16 + 2) \div 2 = 9 \checkmark$$

$$5) \text{ Mode } 10$$

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I randomly selected 20 students and here are their ages:

18	19	20	23	23
25	25	25	27	28
28	30	30	30	32
34	35	38	38	40

- Sample Size
- $n = 20$
 - Min. = 18, Max = 40
 - Range = Max - Min
= 40 - 18 = 22

4) Midrange = $\frac{\text{Max} + \text{Min}}{2} = \frac{40 + 18}{2} = 29$

5) Mode: 25 & 30 **Bimodal**

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Make a freq. table to organize this sample.

How many classes? 3 classes

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

If decimal → Round-up

If whole → Add 1

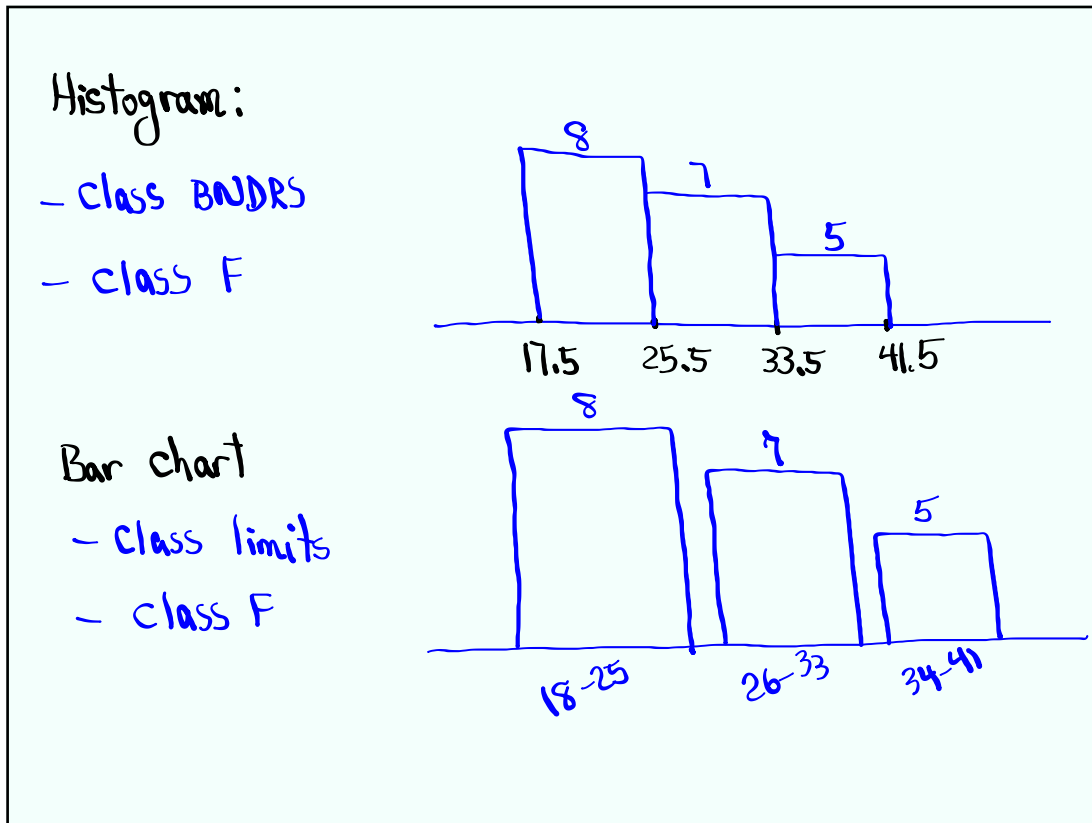
$CW = \frac{22}{3} = 7.3 \Rightarrow CW = 8$ ✓

class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	% F
18 - 25	17.5 - 25.5	21.5	8	8	.40	40%
26 - 33	25.5 - 33.5	29.5	7	15	.35	35%
34 - 41	33.5 - 41.5	37.5	5	20	.25	25%

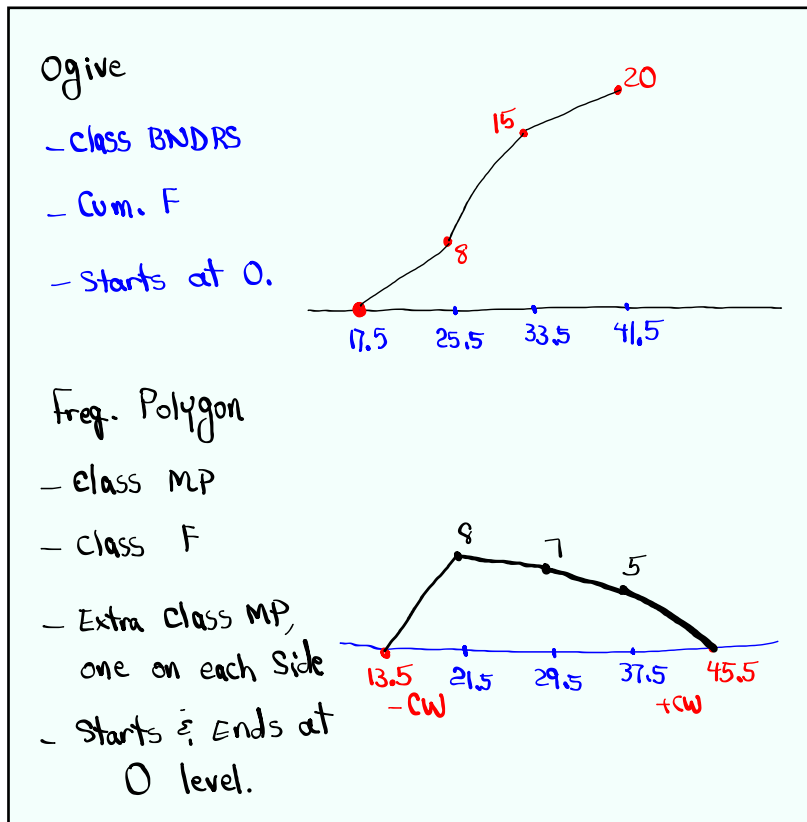
class MP = $\frac{\text{+ class limits}}{2}$
 = $\frac{\text{+ class BNDRS}}{2}$

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

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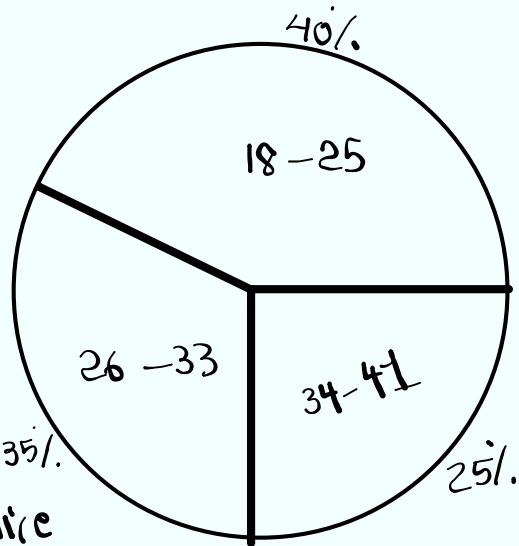
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Pie chart

- Circle
- % F
- class MP or class limits to 35%
name each slice



SG 3 & 4 ✓

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