

Statistics Lecture 1



Feb 19-8:47 AM

Review Basic Math

1) Reduce $\frac{36}{45}$.

$$\frac{36}{45} = \frac{\cancel{2} \cdot 12}{\cancel{2} \cdot 15} = \frac{\cancel{3} \cdot 4}{\cancel{3} \cdot 5} = \boxed{\frac{4}{5}}$$

TI-83 or TI-84
G. CALCULATOR

36 \div 45 [MATH] 1: $\frac{\square}{\square}$ Enter

2) write $.000000375$ in Scientific Notation.

8 times \uparrow

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

2) 3.75×10^{-8}

3) write .5%

a) in decimal optional

$$.5\% = .5 \cdot (.01) = \boxed{.005}$$

3a) $.005$

b) in reduced fraction

$$.5\% = .5 \cdot \frac{1}{100} = \frac{1}{2} \cdot \frac{1}{100} = \boxed{\frac{1}{200}}$$

3b) $\frac{1}{200}$

Feb 28-8:09 AM

4) I took a sample of 185 students and 3.2% of them were left-handed. How many were left-handed? **If decimal, Round-up.**

What is 3.2% of 185?

$$\begin{aligned} x &= 3.2(.01) \cdot 185 \\ &= .032(185) = 5.92 \approx 6 \end{aligned} \quad \begin{array}{r} 4) 6 \\ \hline \end{array}$$

In a class of 40 students, 8 got A for the class.

What % of the class got an A for grade?

8 is what percent of 40?

$$\begin{aligned} 8 &= \frac{P}{100} \cdot 40 & 8 &= \frac{40}{100} P \\ 100 \cdot 8 &= 100 \cdot \frac{40}{100} P \\ 800 &= 40 P \\ \frac{800}{40} &= P \\ P &= 20 & 20\% \end{aligned}$$

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Consider the numbers below

2, 3, 3, 5, 7 \rightarrow 5 Numbers

find $\sum x = 2 + 3 + 3 + 5 + 7 = 20$

Summation \rightarrow Numbers

find $\sum x^2 = 2^2 + 3^2 + 3^2 + 5^2 + 7^2$

$$= 4 + 9 + 9 + 25 + 49 = 96$$

find $\frac{n \sum x^2 - (\sum x)^2}{n(n-1)}$ where n is how many numbers in that set.

$$= \frac{5 \cdot 96 - 20^2}{5(5-1)} = \frac{480 - 400}{5 \cdot 4} = \frac{80}{20} = 4$$

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Use Your Calc. to simplify

$$1) \frac{43-35}{\sqrt{25}} = \frac{8}{5} = 8 \div \frac{8}{5} = \cancel{8} \cdot \frac{5}{\cancel{8}} = \boxed{5}$$

1) 5

$$2) 1.96 \cdot \sqrt{\frac{(.8)(.2)}{100}}$$

$$= 1.96 \cdot \sqrt{\frac{.16}{100}} = 1.96 \cdot \frac{.4}{10}$$

$$= 1.96(.04) = .0784$$

Round

1-decimal → .1

2-decimal → .08

3-decimal → .078

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! Factorial

$$n! = n(n-1)(n-2)(n-3) \dots 3 \cdot 2 \cdot 1$$

$$0! = 1$$

$$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$$

Simplify $\frac{6!}{4!} = \frac{6 \cdot 5 \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1}}{\cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1}} = 6 \cdot 5 = \boxed{30}$

Given $y = 4x - 30$

Find y when $x = 7.5$

$$y = 4(7.5) - 30$$

$$= 30 - 30$$

$$= \boxed{0}$$

Do not use \emptyset for zero.

Find x when $y = 30$.

$$y = 4x - 30$$

$$30 = 4x - 30$$

$$30 + 30 = 4x$$

$$60 = 4x$$

$$x = \frac{60}{4}$$

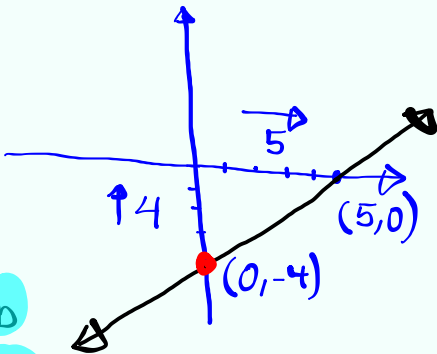
$$\boxed{x = 15}$$

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Graph $4x - 5y = 20$

Method I:

x	y
0	-4
5	0



Method II: write in $y = mx + b$

$4x - 5y = 20$

$-5y = -4x + 20$

$y = \frac{4}{-5}x + \frac{20}{-5}$

$y = -\frac{4}{5}x - 4$

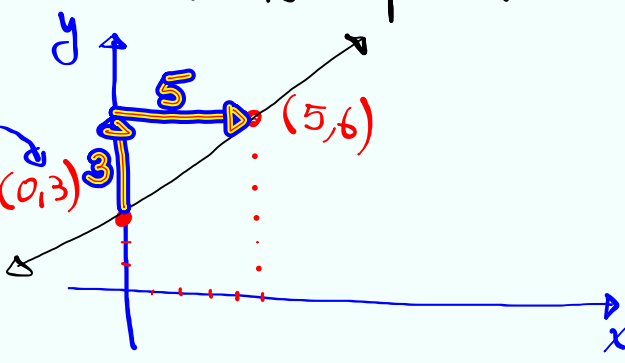
Slope-Int. Form

Rise \downarrow $\frac{4}{5}$ Run \leftarrow

Y-Int $(0, -4)$

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Plot $(0, 3)$ & $(5, 6)$, Draw the line that contains them, then find its equation in $y = mx + b$ Form.



$y = \frac{3}{5}x + 3$

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I surveyed 80 people. Total # of people in the survey?

30 were fan of LA Dodgers.

40 " " " LA Lakers.

25 " " " both teams.

Make the Venn Diagram.

organize the information visually.

$30 - 25 = 5$

$40 - 25 = 15$

$80 - 45 = 35$

SG 1

Dodgers

Lakers

5

25

15

Total = 80

35

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SG 2

what is statistics?

It is study of information (Data)

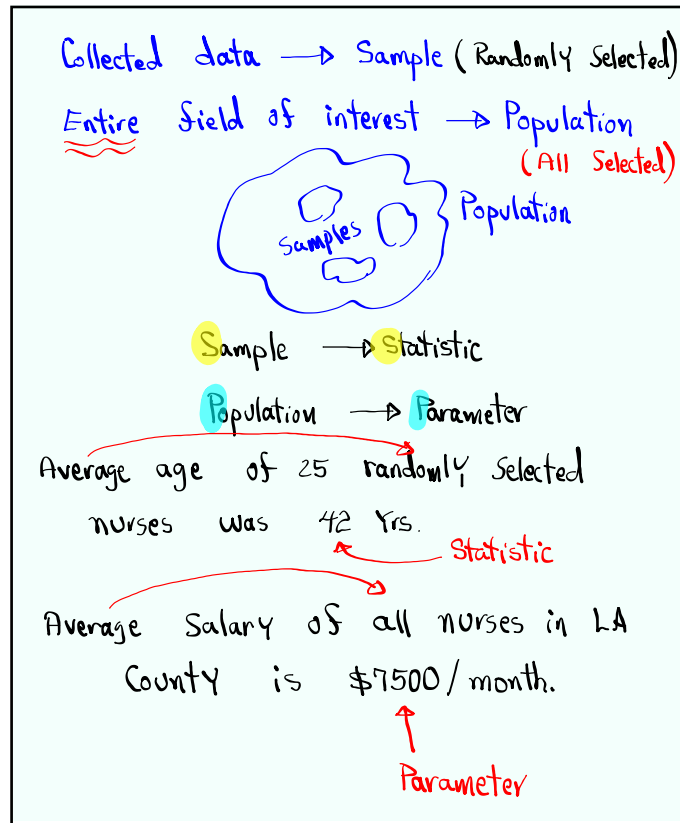
we collect data, we organize data, we graph data, we do certain computations with data, we use data to make predictions.

Two Branches

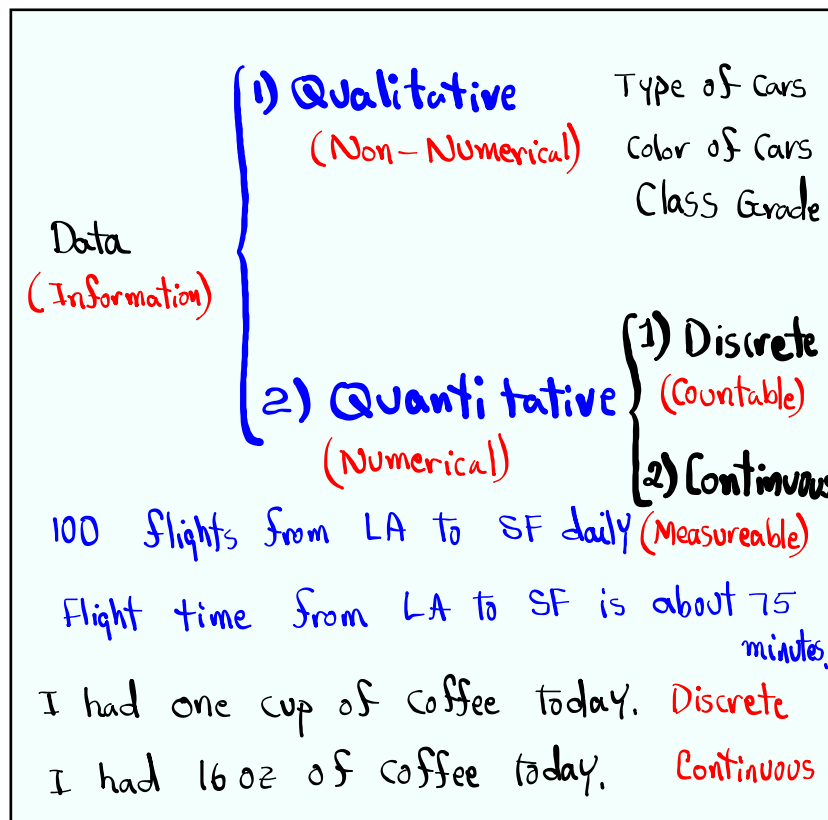
1) Descriptive
Collect, organize, graph, and make calculations with data.

2) Inferential
Draw conclusion from data & make predictions with some level of confidence.

Feb 28-9:30 AM



Feb 28-9:35 AM



Feb 28-9:40 AM

Level of measurements:

- 1) Nominal → Names
Eye color, Brand of cars,
Sports type
- 2) ordinal → order is meaningful
Small, Med., Large, x-Large
- 3) Interval → Range of Values
90% - 100% → A
0 oz - 49 oz → \$2.75 for Postage
- 4) Ratio → Ratio is meaningful
Small 12 oz Large 24 oz Ratio is 2 to 1

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Methods on Collecting data

- 1) Systematic
Every kth item is selected.
- 2) Stratified
Divide into groups.
Select from each group
- 3) Cluster
Divide into groups
Select few groups
Collect data from all members
of selected groups.
- 4) Random / Convenience
Least Reliable Method

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I randomly selected 200 students
from Cal Poly.

50 → Fresh. **Stratified**
75 → Soph.
50 → Jr.
10 → Sr.
15 → Graduate Students.

College is offering 200 sections of
different STEM courses.

I randomly selected 40 of these sections
and asked all those students to complete
a survey.

Cluster

Feb 28-10:03 AM

Given: $n=12$, $\sum x=96$, $\sum x^2=768$

Compute

$$1) \frac{\sum x}{n} = \frac{96}{12} \\ = \boxed{8}$$

$$2) \frac{n\sum x^2 - (\sum x)^2}{n(n-1)} \\ = \frac{12 \cdot 768 - 96^2}{12(12-1)} \\ = \frac{9216 - 9216}{132} = \frac{0}{132} \\ = \boxed{0}$$

Do not use
0 for zero.

Feb 28-10:08 AM

Observation

VS. Experiment

You notice changes
without taking
any action.

You notice changes
due to some
action taken

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A data Set has a min=10 & Max=90.

Compute

$$1) \text{ Max} - \text{Min} = 90 - 10 = \boxed{80}$$

$$2) \frac{\text{Max} + \text{Min}}{2} = \frac{90 + 10}{2} = 50 \quad (90 + 10) \div 2 \rightarrow 95$$

$$3) \frac{(\text{Max} - \text{Min})^2}{12} = \frac{(90 - 10)^2}{12} = \frac{80^2}{12} = \frac{6400}{12} = \boxed{}$$

Reduced Fraction

$$6400 \div 12 \quad \boxed{\text{Meth}} \quad 1: \blacktriangleright \text{Frac} \quad \boxed{\text{Enter}}$$

SG 2 ✓

$$\frac{1600}{3}$$

Feb 28-10:15 AM

Preview of SG 3

One way to organize data is to make a Freq. table.

class limits	class BNDRS	class MP	class F	Cum. F	Rel. F	% F
61 - 71	60.5 - 71.5	66	4	4	.16	16%
72 - 82	71.5 - 82.5	77	6	10	.24	24%
83 - 93	82.5 - 93.5	88	10	20	.40	40%
94 - 104	93.5 - 104.5	99	5	25	.20	20%

$\frac{71.5}{71 \quad 72}$, class MP = $\frac{\text{class limits}}{2}$ Sample Size $n=25$

$$\text{Rel. F} = \frac{f}{n} = \frac{f}{25} \quad \% F = \text{Rel. F} (100)\%$$

Sample Size

We use Freq. table to do some drawing.

- 1) Bar chart
- 2) Histogram
- 3) O give
- 4) Freq. Polygon
- 5) Pie chart

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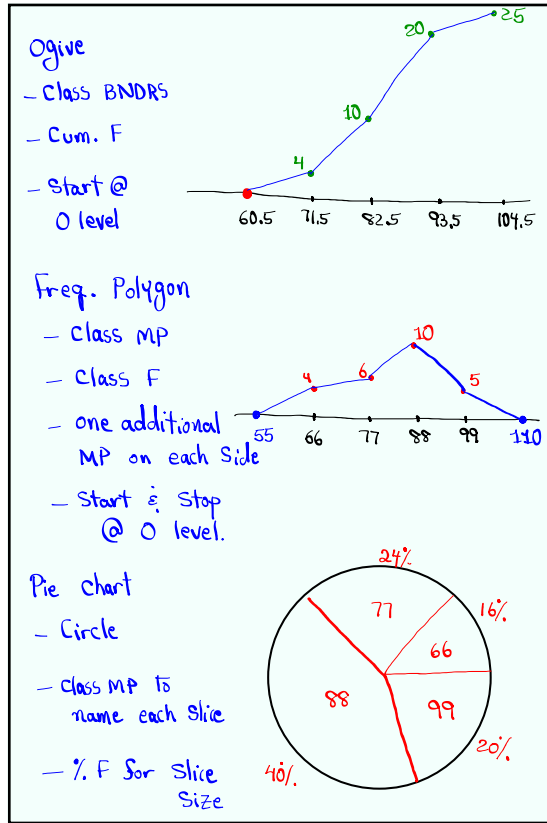
Bar chart

- class limits
- class F

Histogram

- class BNDRS
- class f

Feb 28-10:51 AM



Feb 28-10:55 AM