

# Statistics

## Lecture 1



Feb 19-8:47 AM

Review Basic MATH

SG 1

1) Divide 175 by 400.

$$\frac{175}{400} = .4375$$

$$1) \underline{.4375}$$

Round to

1 - decimal      .4

2 - decimal      .44

3 - decimal      .438

$$2) \text{ Reduce } \frac{175}{400} = \frac{\cancel{5} \cdot 35}{\cancel{5} \cdot 80} = \frac{\cancel{5} \cdot 7}{16 \cdot \cancel{5}} = \frac{7}{16} \quad 2) \underline{\frac{7}{16}}$$

Oct 23-7:26 AM

3) write .25% in

a) decimal  
 $.25\% = .25(.01) = \boxed{.0025}$       3a) .0025

b) reduced fraction  
 $.25\% = .25\left(\frac{1}{100}\right) = \frac{1}{4} \cdot \frac{1}{100} = \frac{1}{400}$       3b)  $\frac{1}{400}$

4) 20% of 1250 people were smokers.  
 how many of them were **not** smokers?

20% → Smokers      what is 80% of 1250?  
 80% → Not Smokers      80% (1250) =  
    .80 (1250) = 1000  
    4) 1000

Oct 23-7:31 AM

Use your Calc to find

$\frac{38 - 20}{8}$   
 $\sqrt{25}$

$= \frac{18}{8} = \frac{18}{1.6} = \boxed{11.25}$

Round up → 12  
 Round to whole # → 11  
 " " 1-decimal → 11.3

▶ We only use TI-83 or TI-84.

Oct 23-7:39 AM

Use Your Calc to Simplify

$$1.645 \cdot \sqrt{\frac{(.8)(.2)}{25}}$$

$$= 1.645 \cdot \frac{\sqrt{(.8)(.2)}}{\sqrt{25}} = 1.645 \cdot \frac{\sqrt{.16}}{\sqrt{25}}$$

$$= 1.645 \cdot \frac{.4}{5} = \boxed{.1316}$$

Scientific Notation  $n \leftarrow$  any Integer

$$N \times 10^n$$

↑  
 $1 \leq N < 10$

$$2.75 \times 10^8 = \underbrace{2.7500000000}_{\text{wavy line}} = \boxed{275,000,000}$$

$$4.8 \times 10^{-5} = \underbrace{000004.8}_{\text{wavy line}} = \boxed{0.000048}$$

↑ optional

Oct 23-7:44 AM

Factorial !

$$0! = 1$$

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

$$1! = 1$$

$$2! = 2 \cdot 1$$

$$3! = 3 \cdot 2 \cdot 1$$

⋮

$$8! = 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$$

Simplify

$$9! - 6! =$$

$$9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 -$$

$$6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 =$$

$$362880 - 720 =$$

$$= \boxed{362160}$$

Simplify

$$\frac{8!}{5! \cdot 3!} = \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 \cdot 3 \cdot 2 \cdot 1}$$

$$= 8 \cdot 7 = \boxed{56}$$

Oct 23-7:51 AM

A box has 8 red, 7 white, and 5 blue balls.  
 what percentage of balls are not red?

12 are not red

20 Total balls.

12 is what percent of 20?

$$\frac{12}{20} \cdot 100 = \boxed{60}$$

60%

Oct 23-7:59 AM

Consider  $y = 2.4x - 12$

1) find  $y$  when  $x = 5$

$$y = 2.4(5) - 12$$

$$= 12 - 12 = \boxed{0}$$

Do not use  
 $\emptyset$  for 0.

2) find  $x$  when  $y = -18$ .

$$-18 = 2.4x - 12$$

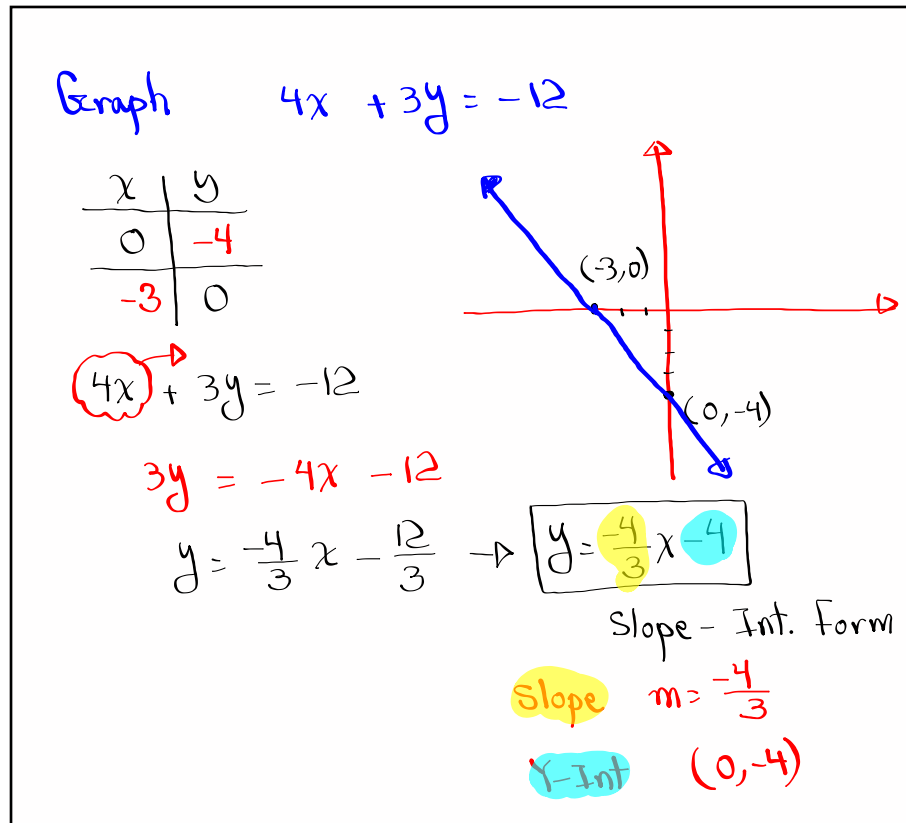
$$-18 + 12 = 2.4x$$

$$-6 = 2.4x$$

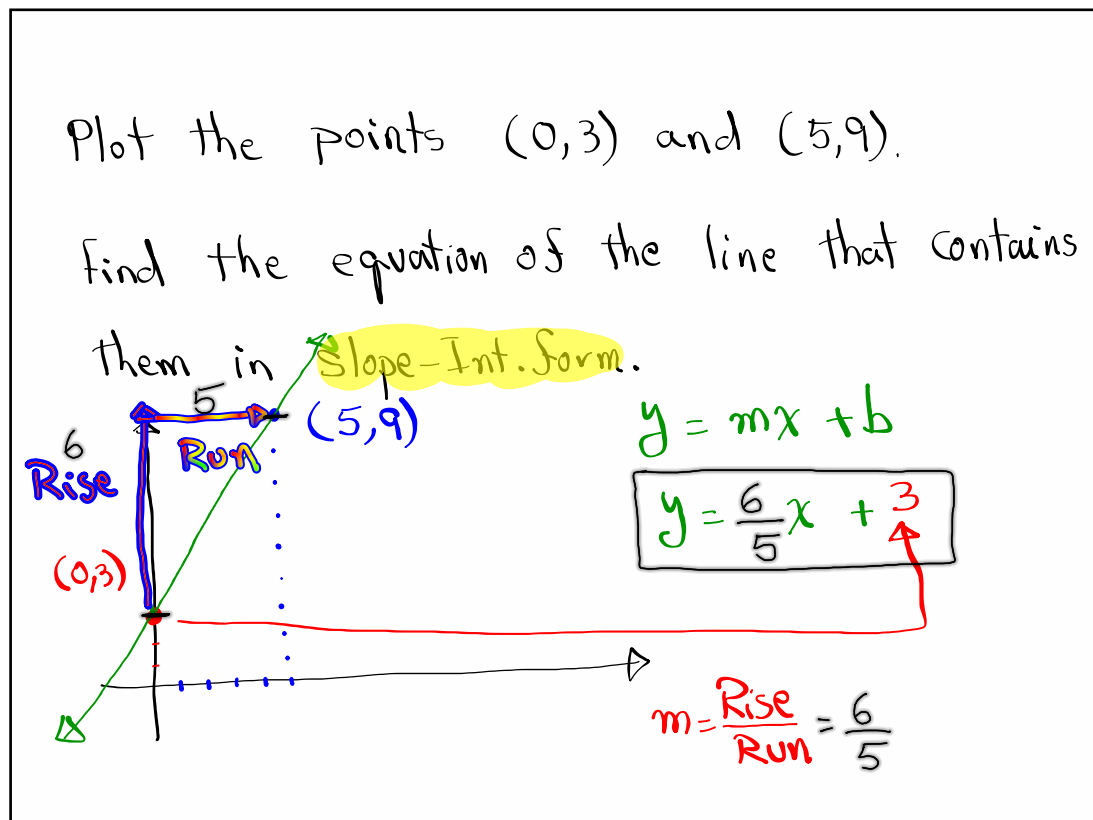
$$x = \frac{-6}{2.4}$$

$$\boxed{x = -2.5}$$

Oct 23-8:03 AM



Oct 23-8:08 AM



Oct 23-8:13 AM

I surveyed 60 people.

12 were fan of UCLA only.

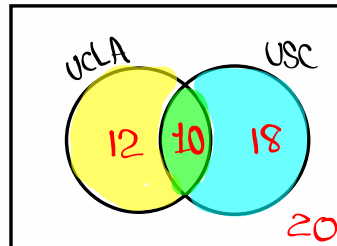
18 " " " USC "

10 " " " both Schools.

Construct Venn Diagram.

SG-1

method to  
organize  
data visually.



Total = 60

[www.mymathclasses.com](http://www.mymathclasses.com)

Oct 23-8:19 AM

Terminologies in Statistics:

SG-2

what is statistics?

It is about collecting information (data),  
organize the information, draw graphs,  
do certain computations, and draw  
conclusion.

Two Branches

1) Descriptive

2) Inferential

Oct 23-8:54 AM

Descriptive Statistics:

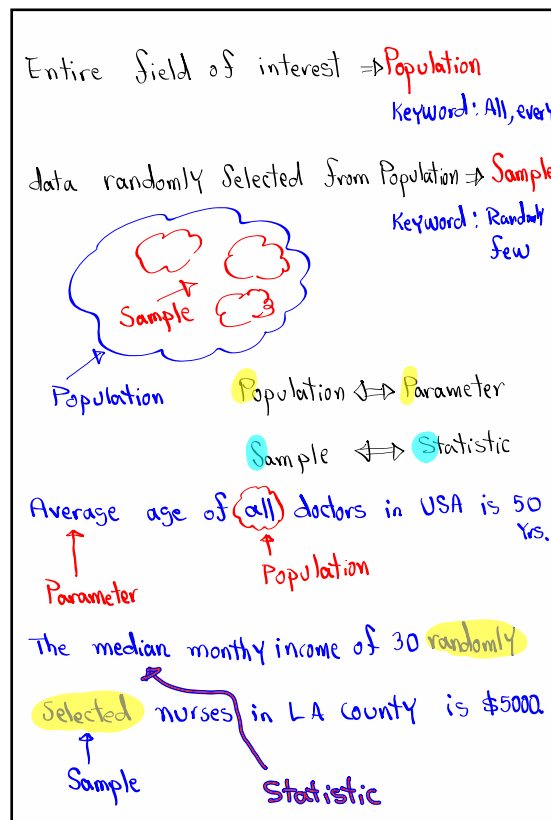
Collect data, organize and graph,

Perform certain computations

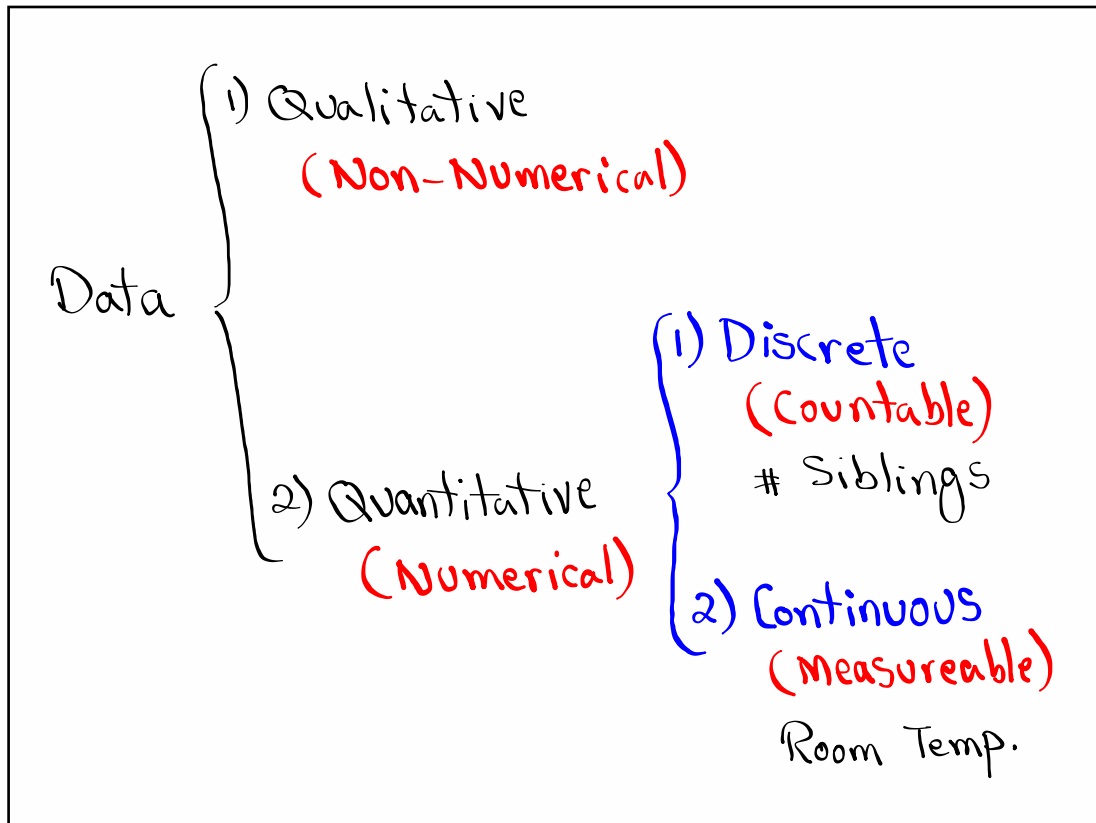
Inferential Statistics:

Draw conclusion from descriptive statistics with some level of confidence and make predictions.

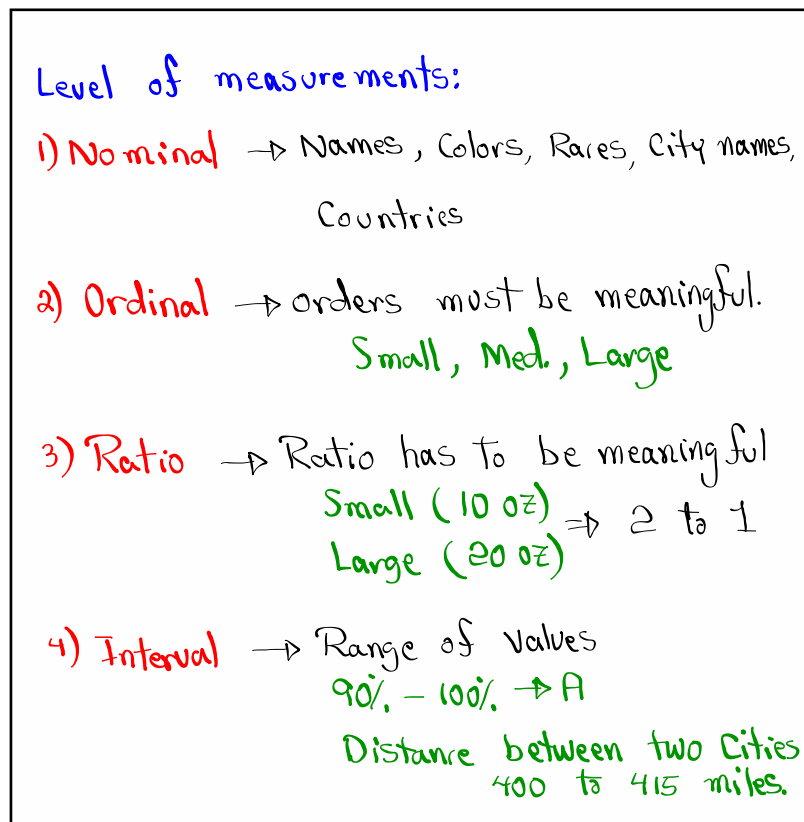
Oct 23-8:58 AM



Oct 23-9:01 AM



Oct 23-9:08 AM



Oct 23-9:12 AM



How to collect data:

1) **Systematic** → Every  $k$ th item Selected

Record every 10th call

Select every 20th item

for inspection

2) **Stratified** → Divide into groups,  
Select few from each group

75 Students {

40	Females	
	(Select 10 Females)	
35	Males	
	(Select 8 males)	

Oct 23-9:18 AM

3) **Cluster** → Divide into groups

Select few groups

Collect data from every  
member of selected groups

College offers 1000 sections during

Summer term. Let's randomly select 100

of them, and ask all  
students from selected  
sections to do student  
survey.

4) **Random / Convenience**

"Least Reliable Method"

Oct 23-9:24 AM

Experiment Vs Observation

Experiment : You take action and observe changes.

Observation : No action taken but You observe changes.

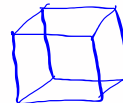
Simple Random Sample:

Every item of the Sample has the same chance of being selected.

Oct 23-9:31 AM

A Six-Sided fair die numbered 1, 2, 3, 4, 5, 6

is rolled twice.



1,1	1,2	---	1,6
2,1	2,2	---	2,6
...	...	---	...
6,1	6,2	---	6,6

Can You set a total of 3? Yes not likely

Can You get a total between 3 and 11? Yes, very likely

Can You get a total of 15? No, Impossible

SG 2

Oct 23-9:37 AM

Class QZ 1

1) What kind of calculator do we use  
for this class?

TI-83 OR TI-84

2) Find  $y$  when  $x=8$  for  $y=-5x+40$ .

$$\begin{aligned}y &= -5(8) + 40 \\ &= -40 + 40 \Rightarrow y=0\end{aligned}$$

Oct 23-9:42 AM