

Statistics

Lecture 1



Feb 19-8:47 AM

Math Review

1) Reduce $\frac{120}{150} = \frac{12 \cdot \cancel{10}}{15 \cdot \cancel{10}} = \frac{\cancel{3} \cdot 4}{\cancel{3} \cdot 5} = \boxed{\frac{4}{5}}$

1) $\frac{4}{5}$

2) write .5% in

a) decimal

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

2a) $.005$

b) Reduced fraction

$.5\% = \frac{.5}{100} = \frac{.5(10)}{100(10)} = \frac{\frac{1}{2}}{1000} = \boxed{\frac{1}{2000}}$

2b) $\frac{1}{2000}$

Mar 2-1:57 PM

3) I Selected 200 students randomly and 4% of them were left-handed.

How many were left-handed?

what is 4% of 200?

$$x = \frac{4}{100} \cdot 200$$

$$= 4 \cdot 2 = 8$$

3) 8

4) In a survey of 80 students, 16 of them were nursing major.

what % of them were nursing major?

16 is what % of 80?

$$16 = \frac{P}{100} \cdot 80$$

$$P = \frac{16}{.8}$$

$$P = 20$$

$$16 = .8P$$

4) 20%

Mar 2-2:02 PM

Scientific Notation

$$N \times 10^n$$

any integer

$$1 \leq N < 10$$

$$2.5 \times 10^8$$

$$1.75 \times 10^{-4}$$

$$2.5 \times 10^8 = 2.5 \underbrace{00000000}_8 = 250,000,000$$

$$1.75 \times 10^{-4} = \underbrace{0000}_4 1.75 = 0.000175$$

optional

Mar 2-2:12 PM

! Factorial

$$0! = 1$$

$$1! = 1$$

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

$$3! = 3 \cdot 2 \cdot 1 = 6$$

$$6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 720$$

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

Simplify $7! - 4! = 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 - 4 \cdot 3 \cdot 2 \cdot 1$
 $= 5040 - 24 = 5016$

Simplify $\frac{8!}{6! \cdot 2!} = \frac{\overset{4}{\cancel{8}} \cdot \cancel{7} \cdot \cancel{6} \cdot \cancel{5} \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1}}{\cancel{6} \cdot \cancel{5} \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1} \cdot \cancel{2} \cdot \cancel{1}} = \frac{28}{1} = 28$

Mar 2-2:16 PM

Use my calc to find

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

$$= 1.645 \cdot \sqrt{\frac{.16}{25}}$$

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

Round to

$$1\text{-dec.} \quad .1$$

$$2\text{-dec.} \quad .13$$

$$3\text{-dec.} \quad .132$$

Mar 2-2:24 PM

Given $y = 8x - 40$

Do not use
0 for Zero.

a) Find y when $x=5$.

$$y = 8(5) - 40 = 40 - 40 = \boxed{0}$$

b) Find x when $y=-120$.

$$-120 = 8x - 40$$

$$-120 + 40 = 8x$$

$$-80 = 8x$$

$$\frac{-80}{8} = x$$

$$\boxed{x = -10}$$

Mar 2-2:28 PM

Graph $2x + 3y = 12$

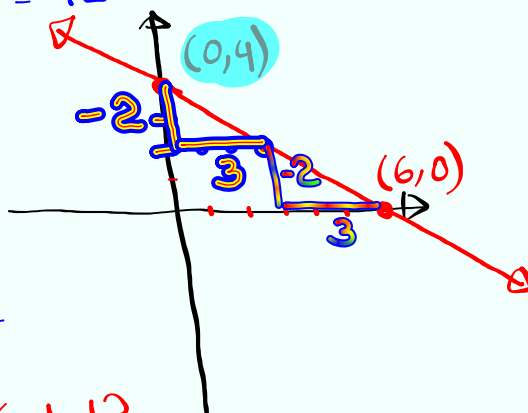
x	y
0	4
6	0

$$2x + 3y = 12$$

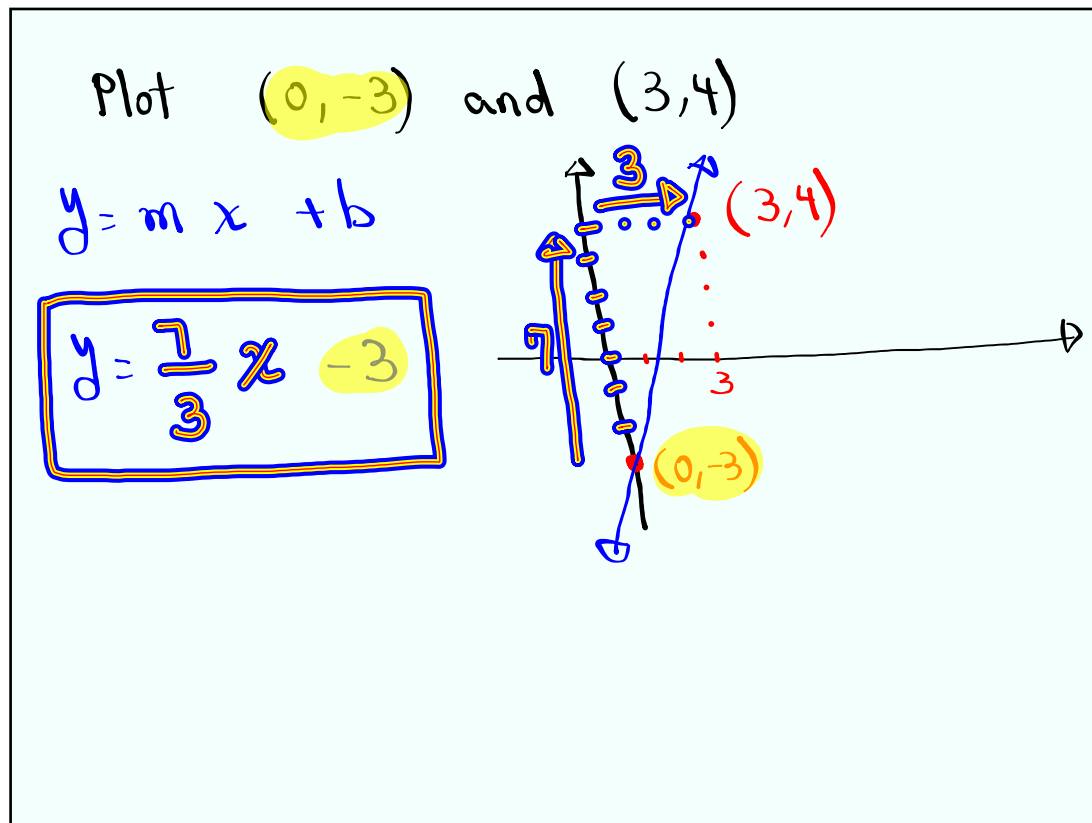
$$3y = -2x + 12$$

$$\boxed{y = -\frac{2}{3}x + 4}$$

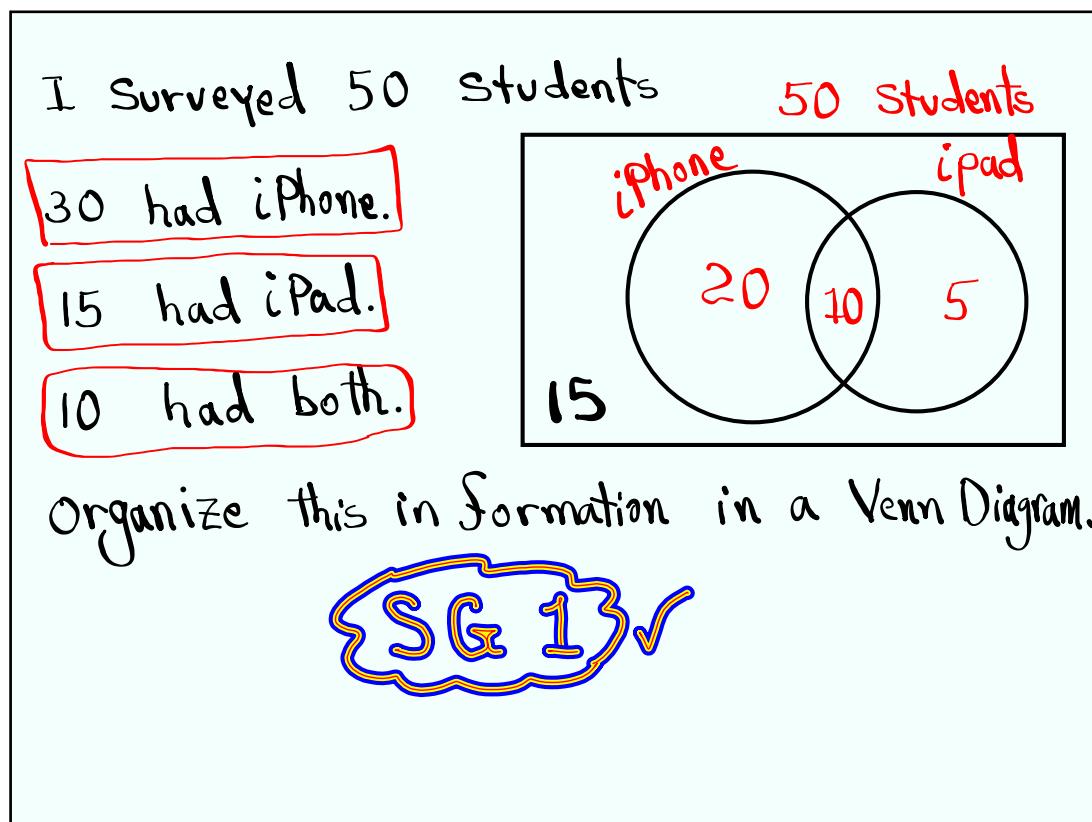
Slope-Int Form



Mar 2-2:33 PM



Mar 2-2:38 PM



Mar 2-2:42 PM

Definitions & Terminologies:

what is statistics?

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

Two Branches:

1) Descriptive: About working with collected data.

2) Inferential: About making predictions

Mar 2-3:09 PM

Population
(Entire Field)

VS

Sample
(Randomly Selected)

Parameter

Statistic

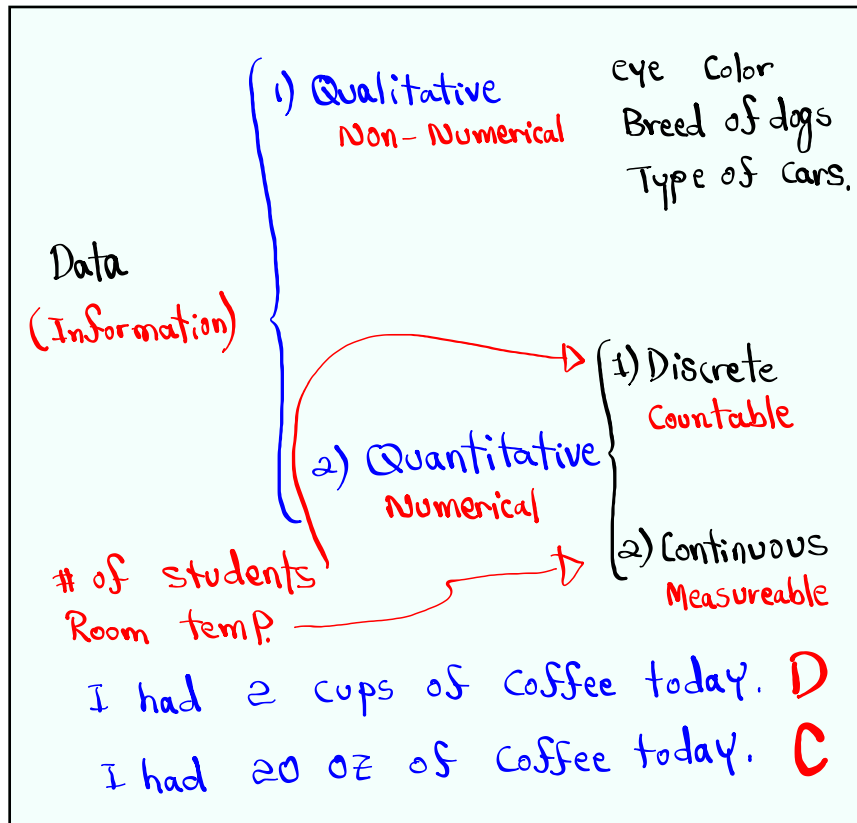
The average age of all college students is 25 yrs.

Parameter

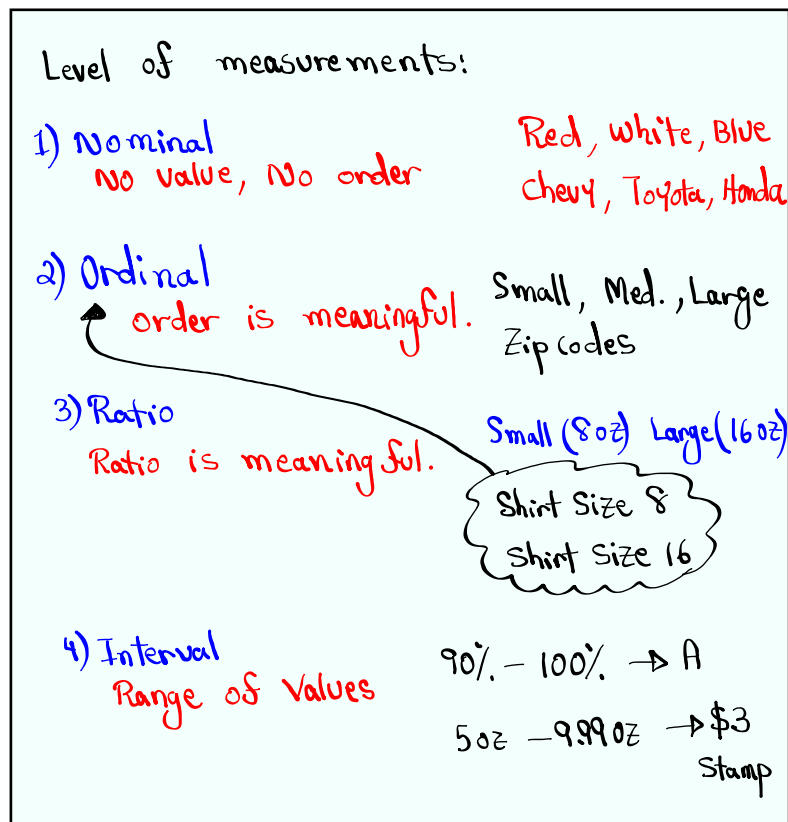
The median income of 40 randomly selected nurses was \$6250/mo.

Statistic

Mar 2-3:15 PM



Mar 2-3:20 PM



Mar 2-3:25 PM

How to collect data:

- 1) Systematic every kth item Selected.
 Select every 5th call to record.
 Every 10th item Selected
 from assembly line for
 inspection.
- 2) Stratified Divide into groups, select
 few from each group.
 Male → Select 4
 Females → " 6

 At university.
 Fresh. → 100
 Soph. → 150
 Jr. → 75
 Sr. → 25
 Graduate → 50
 } Sample Size
 400

Mar 2-3:33 PM

- 3) cluster Divide into groups
 Select few groups
 Collect data from all members
 of selected groups.
 College offers 2000 sections of classes.
 Select 40 Sections
 ask all students from these 40 sections
 to complete a survey.

- 4) Random / Convenience

The least reliable method

Mar 2-3:40 PM

Observation	vs	Experiment
observe changes without any action taken		You take action to observe changes.

Min. = 10 , Max = 50

Find

1) Max - Min
 $= 50 - 10 = \boxed{40}$

3) $\frac{\text{Max} - \text{Min}}{4} = \frac{40}{4} = \boxed{10}$

2) $\frac{\text{Max} + \text{Min}}{2}$
 $= \frac{50 + 10}{2} = \boxed{30}$

4) $\left(\frac{\text{Max} - \text{Min}}{5} \right)^2$
 $= \left(\frac{40}{5} \right)^2 = 8^2 = \boxed{64}$

Mar 2-3:46 PM

find

1) $3 + 5 + 5 + 5 + 7 = \boxed{25}$

2) $3^2 + 5^2 + 5^2 + 5^2 + 7^2 = \boxed{133}$

3) $\frac{8(392) - 56^2}{8(8-1)} = \frac{0}{56} = \boxed{0}$

Do not use
 $\emptyset$ for Zero.

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Mar 2-3:54 PM