

Statistics

Lecture 1



Feb 19-8:47 AM

Basic Math Review:

1) Reduce $\frac{45}{120}$

$$\frac{45}{120} = \frac{\cancel{5} \cdot 9}{\cancel{5} \cdot 24} = \frac{\cancel{3} \cdot 3}{\cancel{3} \cdot 8} = \boxed{\frac{3}{8}}$$

$$1) \quad \underline{\frac{3}{8}}$$

2) Write .005 in

a) Reduced Fraction

$$.005 = \frac{5}{1000} = \frac{\cancel{5} \cdot 1}{\cancel{5} \cdot 200} = \frac{1}{200}$$

$$2a) \quad \underline{\frac{1}{200}}$$

b) Percent Notation

$$.005 = .005 (100\%) = \boxed{.5\%}$$

$$2b) \quad \underline{.5\%}$$

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write 12 500 000 000 000 in Scientific Notation. 1.25×10^{13}

$N \times 10^n$

$1 \leq N < 10$ any integer

7.5×10^8 (Large #) , 3.75×10^{-6} (Small #)

write 4.8×10^{-4} in standard notation.

000048 0.00048 (optional)

Aug 29-8:30 AM

I surveyed 800 students and 90% of them had iPhone.

1) what % of them did not have iPhone?

$$100\% - 90\% = \boxed{10\%}$$

2) How many of them had iPhone?

$$90\% \text{ of } 800 = \frac{90}{100} \cdot 800 = \boxed{720}$$

Aug 29-8:35 AM

we use TI-83 or TI-84 calc.

Use your calc. to simplify

$$\frac{72-60}{\frac{10}{\sqrt{16}}} = \frac{12}{\frac{10}{4}} = \frac{12}{2.5} = \boxed{4.8}$$

Round to a whole # $\rightarrow \boxed{5}$

Simplify $1.645 \cdot \sqrt{\frac{(0.2)(.8)}{25}}$, Round to 2-dec. Places.

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

$$= 1.645 \cdot \frac{.4}{5} = .1316 \approx \boxed{.13}$$

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! Factorial

$$0! = 1$$

$$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{120}$$

$$1! = 1$$

$$8! - 4! = 40320 - 24$$

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

$$= \boxed{40296}$$

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

$\vdots$

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

Simplify $\frac{9!}{6! \cdot 3!} = \frac{\overset{3}{\cancel{9}} \cdot \overset{4}{\cancel{8}} \cdot \cancel{7} \cdot \cancel{6}!}{\cancel{6}! \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1}} = \frac{3 \cdot 4 \cdot 7}{1} = \boxed{84}$

Aug 29-8:45 AM

A standard deck of playing cards has 52 cards, 26 are red, 12 face cards, 4 aces.

what% of cards are face or ace?

16 out of 52

16 is what % of 52?

$$16 = \frac{P}{100} \cdot 52$$

multiply by 100

$$1600 = 52P$$

Divide by 52

$$\frac{1600}{52} = P$$

$$P = 30.769\ldots$$

Round to whole%

$$P \approx 31$$

$$\boxed{31\%}$$

Aug 29-8:50 AM

$$y = 2.5x - 20$$

Do not use

1) Find y when $x = 8$.

Ø for Zero.

$$y = 2.5(8) - 20 = 20 - 20 = \boxed{0}$$

2) Find x when $y = -60$.

$$-60 = 2.5x - 20$$

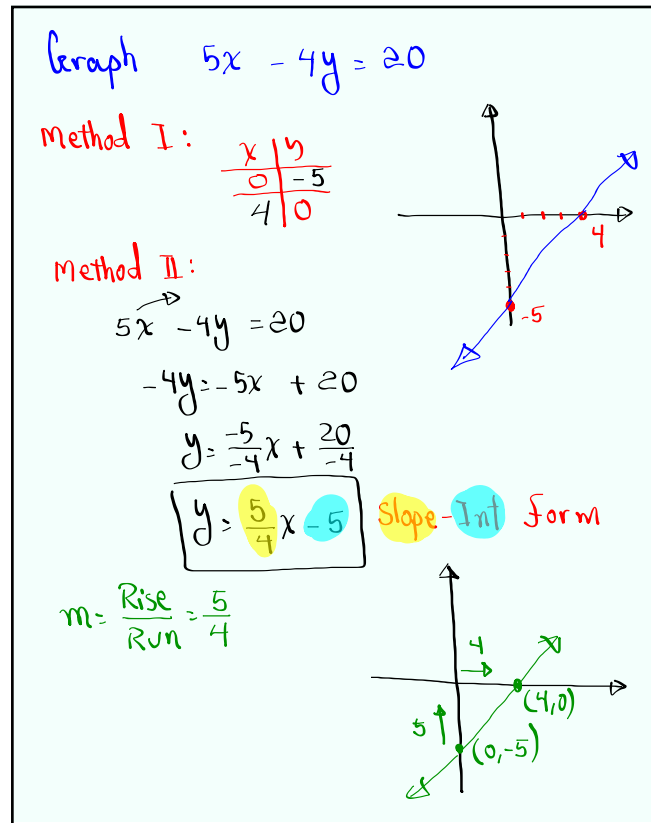
$$-60 + 20 = 2.5x$$

$$-40 = 2.5x$$

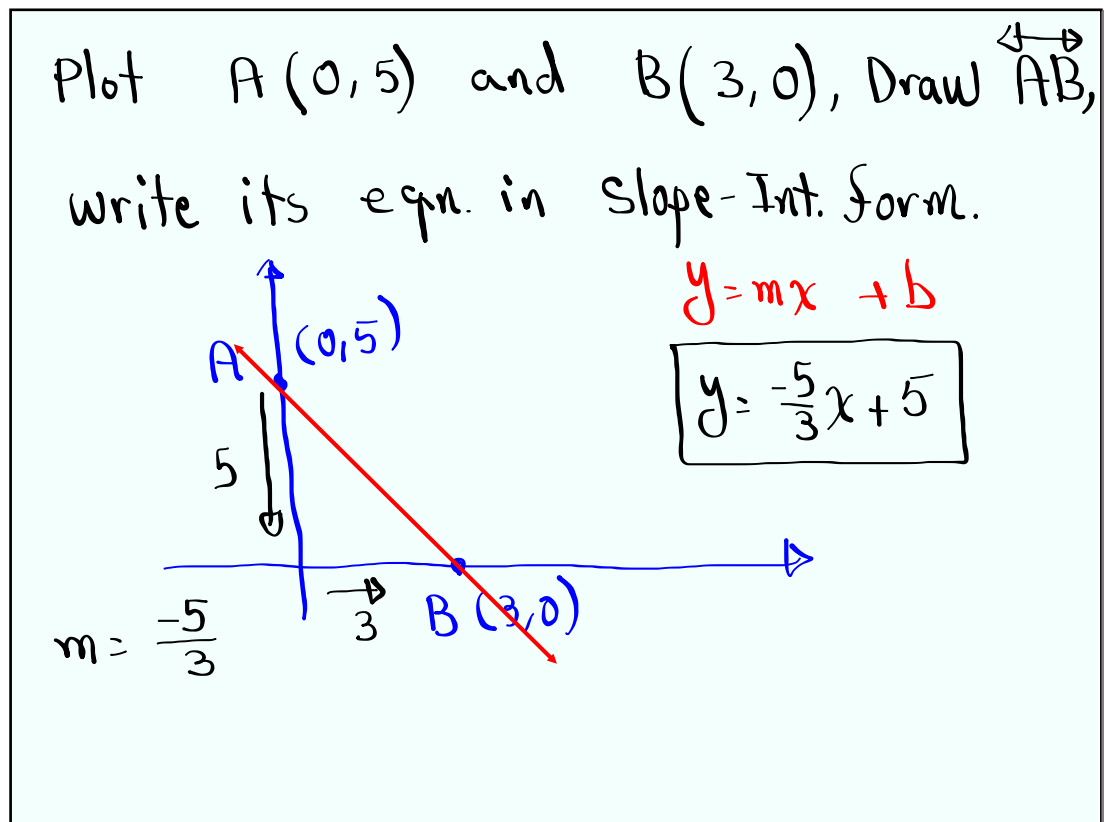
$$\frac{-40}{2.5} = x$$

$$\boxed{x = -16}$$

Aug 29-8:55 AM



Aug 29-8:59 AM



Aug 29-9:04 AM

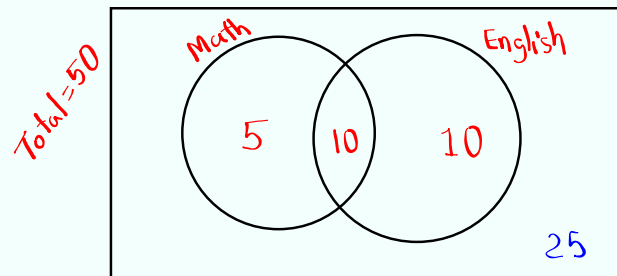
I surveyed 50 students.

20 were English major.

15 " Math " .

10 " English and Math major.

Organize this Survey in a Venn Diagram.



SG 1

Aug 29-9:08 AM

what is statistics?

SG 2

It is about collecting information (Data), we organize them, graph them, do certain computations, and we draw conclusions.

Two Branches:

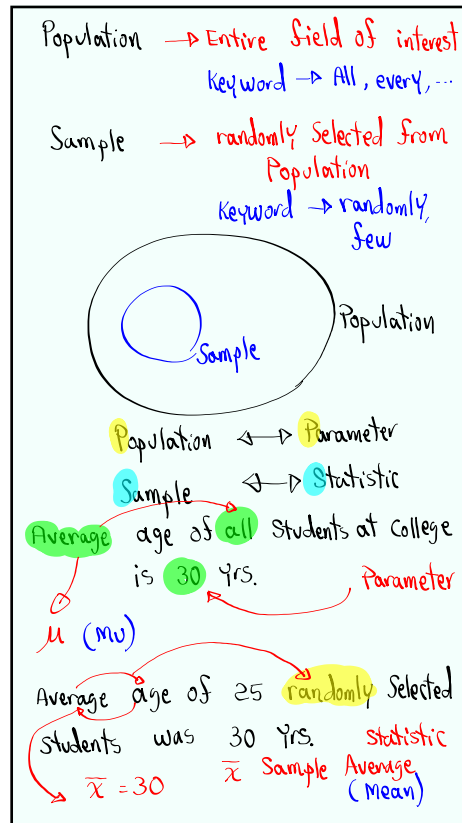
1) Descriptive

collect data, organize, graph, do calculations

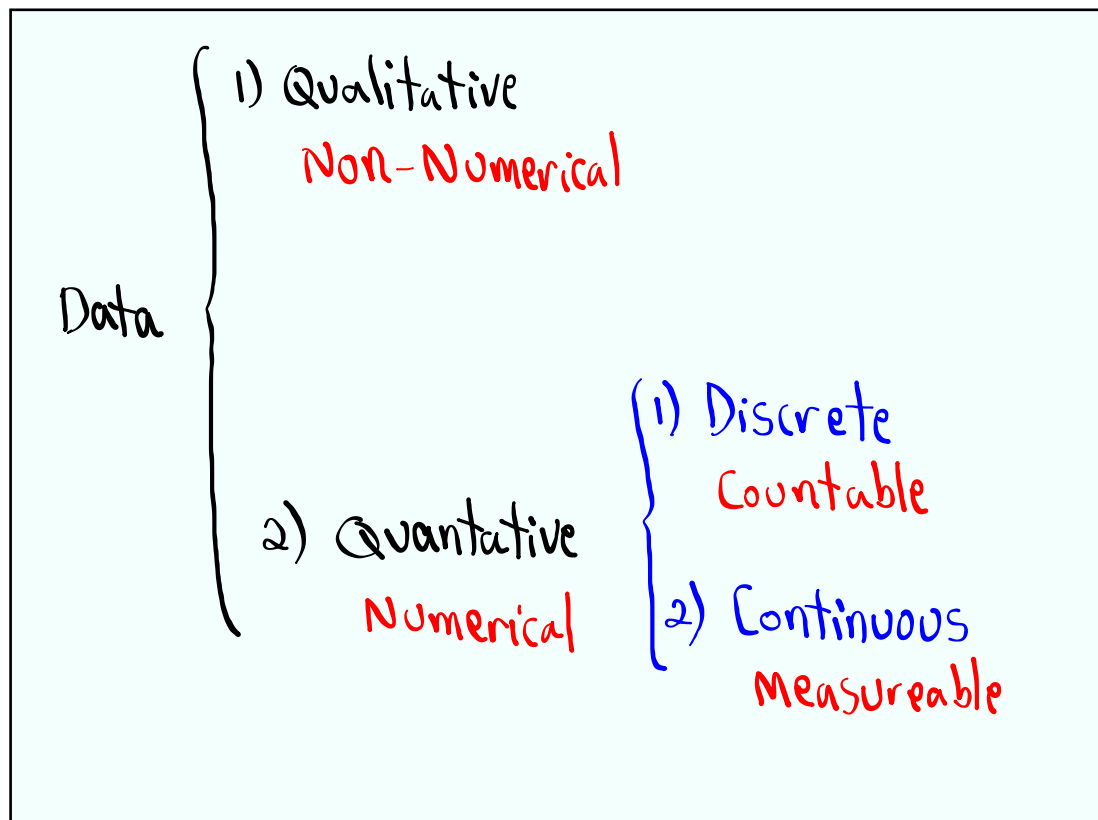
2) Inferential

we draw conclusion based on data taken with some degree of confidence and make predictions

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Aug 29-9:45 AM



Aug 29-9:53 AM

Level of Measurements:

- 1) Nominal Red, white, Blue
Hot, cold
- 2) Ordinal Small, Med., Large
- 3) Ratio 12 oz & 24 oz
1 to 2.
- 4) Interval Range of Values
90 - 100 → A

Aug 29-9:57 AM

How to Collect data: Sampling Methods

- 1) Systematic
every Kth item Selected.
 - 2) Stratified
Divide into groups,
Select few from each group
 - 3) Cluster
Divide into groups,
Select few groups,
Collect data from every member of
Selected groups.
- College offers 1000 different Sections
of classes.
Select 50 Sections randomly,
ask all student from these Sections
to do a Survey.
- 4) Random / Convenience
Least Reliable Method

Aug 29-10:02 AM

Observation Vs Experiment

observe and
take no action

Take action and
observe changes

Simple Random Sample

When all members have same
chance of being taken.

Aug 29-10:12 AM

Suppose Max = 60 , Min. = 20

Find

$$1) \text{ Max} - \text{Min} = 60 - 20 = \boxed{40}$$

$$2) \frac{\text{Max} + \text{Min}}{2} = \frac{60 + 20}{2} = \boxed{40}$$

$$3) \frac{\text{Max} - \text{Min}}{4} = \frac{60 - 20}{4} = \frac{40}{4} = \boxed{10}$$

Step 2

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Consider the Sample below

2, 3, 3, 4, 10

1) Sample Size $n = 5$

2) Min $\hat{=}$ Max. $\text{Min} = 2$, $\text{Max} = 10$

3) Range = Max - Min = $10 - 2 = 8$

4) Midrange: $\frac{\text{Max} + \text{Min}}{2} = \frac{10 + 2}{2} = 6$

5) $\sum x = 2 + 3 + 3 + 4 + 10 = 22$

↑
Summation

6) $\sum x^2 = 2^2 + 3^2 + 3^2 + 4^2 + 10^2 = 138$

7) Mode (data element that appears the most) = 3

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8) $\frac{\sum x}{n} = \frac{22}{5} = 4.4$

9)
$$\frac{n \sum x^2 - (\sum x)^2}{n(n-1)} = \frac{5 \cdot 138 - 22^2}{5(5-1)}$$

$$= \frac{206}{20} = 10.3$$

10) $\sqrt{\text{Last answer}}$, Round to 3-dec. Places

$= \sqrt{10.3} \approx 3.209$

whole $\rightarrow 3$
 1-dec. $\rightarrow 3.2$
 2-dec. $\rightarrow 3.21$

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I randomly graded 10 QZ, here are the scores

2 3 5 5 6 1) $n=10$

8 8 8 9 10 2) $\text{Range} = 10 - 2 = 8$

3) $\text{Midrange} = \frac{10+2}{2} = 6$ 4) $\text{Mode} = 8$

5) $\sum x = 2 + 3 + 5 + \dots + 9 + 10 = 64$

6) $\sum x^2 = 2^2 + 3^2 + 5^2 + \dots + 9^2 + 10^2 = 472$

7) $\frac{\sum x}{n}$, Round to whole # $\frac{64}{10} = 6.4 \approx \boxed{6}$

8) $\frac{n \sum x^2 - (\sum x)^2}{n(n-1)}$, Reduced Fraction

$$= \frac{10 \cdot 472 - 64^2}{10(10-1)} = \frac{624}{90} = \boxed{\frac{104}{15}}$$

624 $\div$ 90 Math 1:frac Enter

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