

Statistics

Lecture 1



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Review of Basic Math:

1) Reduce $\frac{40}{150} = \frac{4(\cancel{10})}{15(\cancel{10})} = \boxed{\frac{4}{15}}$

1) $\frac{4}{15}$

2) write .12 in reduced fraction

$$.12 = \frac{12}{100} = \frac{\cancel{4} \cdot 3}{\cancel{4} \cdot 25} = \boxed{\frac{3}{25}}$$

2) $\frac{3}{25}$

3) write 2.5% in

a) decimal.

$$2.5\% = 2.5(.01) = \boxed{.025}$$

3a) $.025$

b) reduced fraction.

3b) $\frac{1}{40}$

$$2.5\% = \frac{2.5}{100} = \frac{2.5(10)}{100(10)} = \frac{\cancel{25}^1}{\cancel{100}^1(10)} = \boxed{\frac{1}{40}}$$

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8% of 150 students were smokers.

How many of them were smokers?

8% of 150 is what number?

$$.08 \cdot 150 = n$$

$$12 = n$$

$$4) \underline{12}$$

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12 is what% of 150?

$$12 = \frac{P}{100} \cdot 150$$

$$12 = \frac{150}{100} P$$

$$12 = 1.5 P$$

$$P = \frac{12}{1.5}$$

$$P = 8$$

$$5) \underline{8\%}$$

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Use Your Calc. to evaluate

$$\frac{72 - 65}{\frac{16}{\sqrt{4}}} = \frac{7}{\frac{16}{2}} = \frac{7}{8}$$

in decimals

$$\boxed{.875}$$

Round to 1-Dec. $\rightarrow .9$

2-Dec. $\rightarrow .88$

Evaluate $\frac{5(320) - 40^2}{5(5-1)} = \frac{1600 - 1600}{5 \cdot 4} = \frac{0}{20} = \boxed{0}$

Do not use \emptyset for Zero.

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

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

$$= 1.645 \cdot \frac{\sqrt{.16}}{\sqrt{25}} = 1.645 \cdot \frac{.4}{5}$$

$$= \boxed{.1316}$$

1-Dec. $\rightarrow .1$

2-Dec. $\rightarrow .13$

3-dec. $\rightarrow \boxed{.132}$

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! Factorial

$0! = 1$

$1! = 1$

$2! = 2 \cdot 1 = 2$

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

\vdots

$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 20 \cdot 6 = 120$

$\frac{7!}{4! \cdot 3!} = \frac{7 \cdot \cancel{6} \cdot 5 \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1}}{\cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{1}} = 7 \cdot 5 = 35$

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

$8! - 5! = \underbrace{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}_{40320} - \underbrace{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}_{120} = 40200$

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A standard deck of playing cards has 52 cards, 26 Red cards, 12 Face cards, and 4 Aces.

What % of cards are face cards?

12 is what % of 52?

$12 = \frac{P}{100} \cdot 52$

$12 = \frac{52}{100} P$

$12 = .52 P$

$P = \frac{12}{.52}$

$P = 23.07692 \dots$

whole %

23%

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$$y = 4x - 40$$

1) find y when $x = 10$

$$y = 4(10) - 40 = 40 - 40 = \boxed{0}$$

2) find x when $y = 40$.

$$40 = 4x - 40$$

$$40 + 40 = 4x$$

$$80 = 4x$$

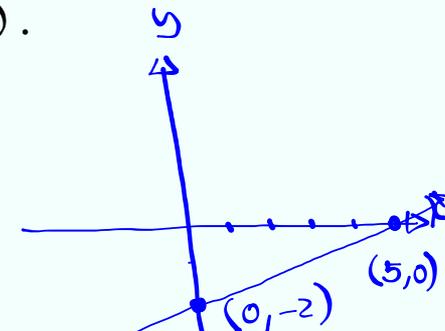
$$\frac{80}{4} = x$$

$$\boxed{x = 20}$$

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Graph $2x - 5y = 10$.

x	y
0	-2
5	0



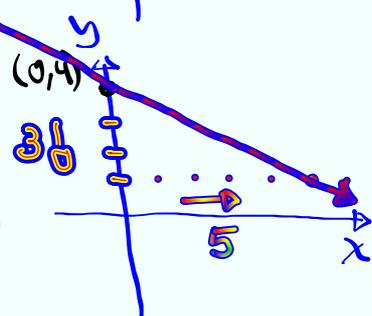
Graph $y = \frac{-3}{5}x + 4$

Rise \rightarrow $\frac{-3}{5}$

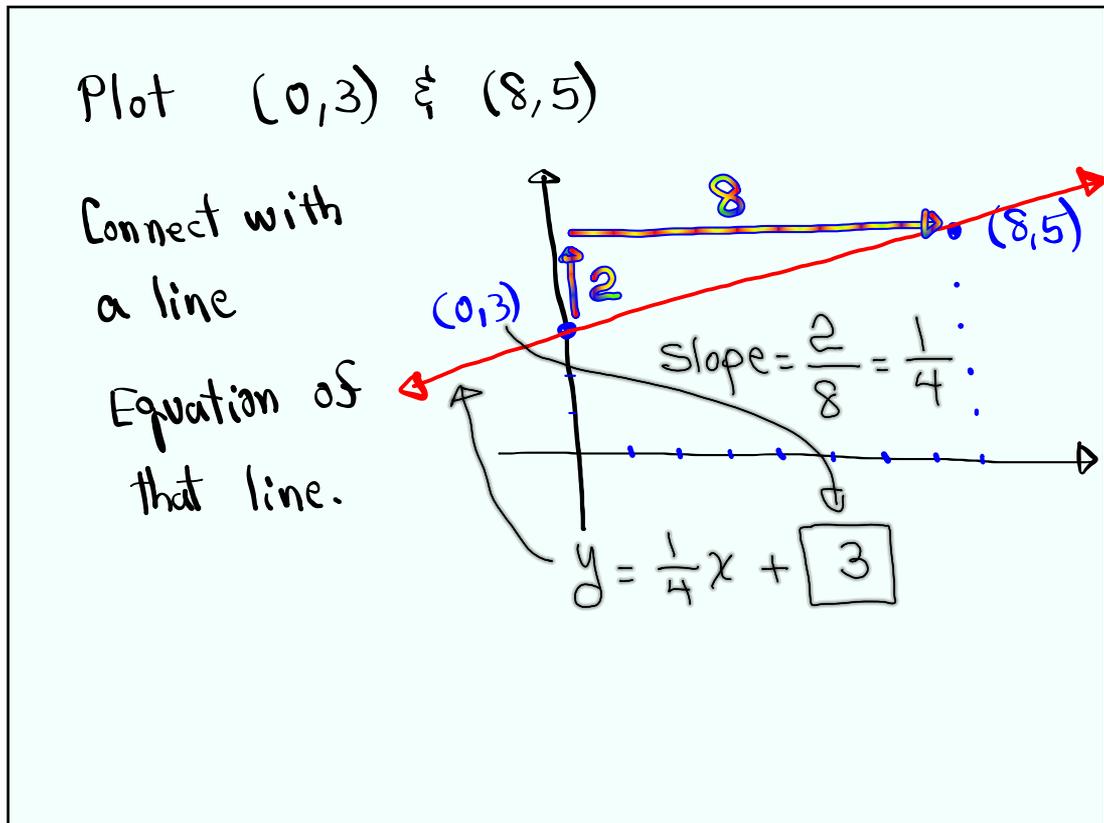
Run \rightarrow 5

Slope \rightarrow $\frac{-3}{5}$

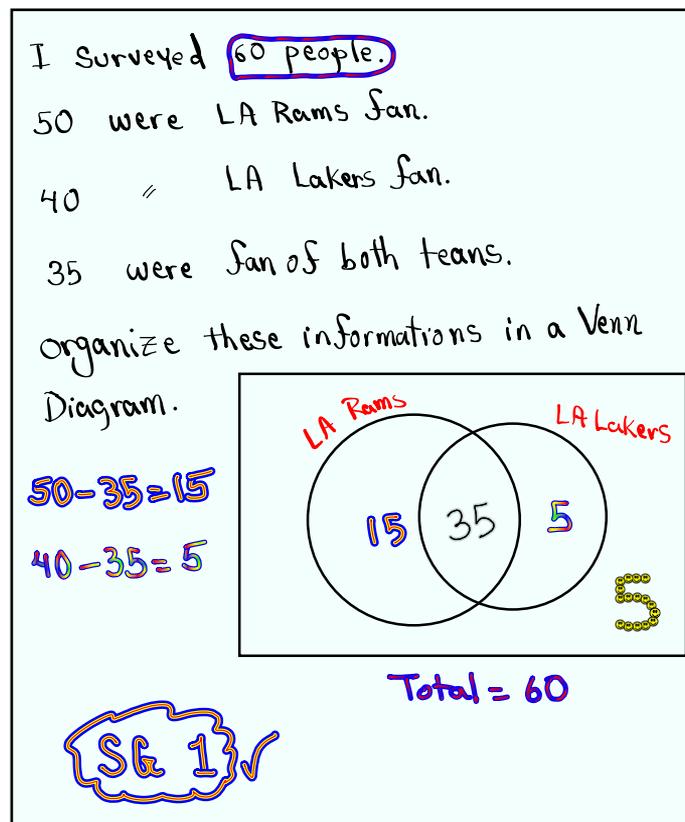
Y-Int \rightarrow (0, 4)



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Scientific Notation

$$N \times 10^n$$

\uparrow \leftarrow any integer

$$1 \leq N < 10$$

5.2×10^8 (8 times), 1.87×10^{-4} (4 times)

5.200000000
= 520000000

optional 00001.87
0.000187

write 2,500,000,000 in S.N.
= 2.5×10^9

write 0.00000000058 in S.N..
 5.8×10^{-10}

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Consider the numbers below

1 2 $\boxed{2}$ 3 7

$$\sum x = 1 + 2 + 2 + 3 + 7 = \boxed{15}$$

\uparrow summation

$$\sum x^2 = 1^2 + 2^2 + 2^2 + 3^2 + 7^2 = \boxed{67}$$

Range = Max - Min = $7 - 1 = \boxed{6}$

Midrange = $\frac{\text{Max} + \text{Min}}{2} = \frac{7+1}{2} = \frac{8}{2} = \boxed{4}$

Mode (Number with highest freq.) = $\boxed{2}$

Median (value in the middle in sorted list)

$\boxed{2}$

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Consider the numbers below

1 2 2 4 4 5
 ↑
 median

$$\sum x = 1 + 2 + 2 + 4 + 4 + 5 = \boxed{18}$$

$$\sum x^2 = 1^2 + 2^2 + 2^2 + 4^2 + 4^2 + 5^2 = \boxed{66}$$

$$\text{Range} = \text{Max} - \text{Min} = 5 - 1 = \boxed{4}$$

$$\text{Midrange} = \frac{\text{Max} + \text{Min}}{2} = \frac{5 + 1}{2} = \frac{6}{2} = \boxed{3}$$

Mode 2 & 4 Bimodal

Median $\frac{2 + 4}{2} = \boxed{3}$ Add the middle 2 numbers then divide by 2

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