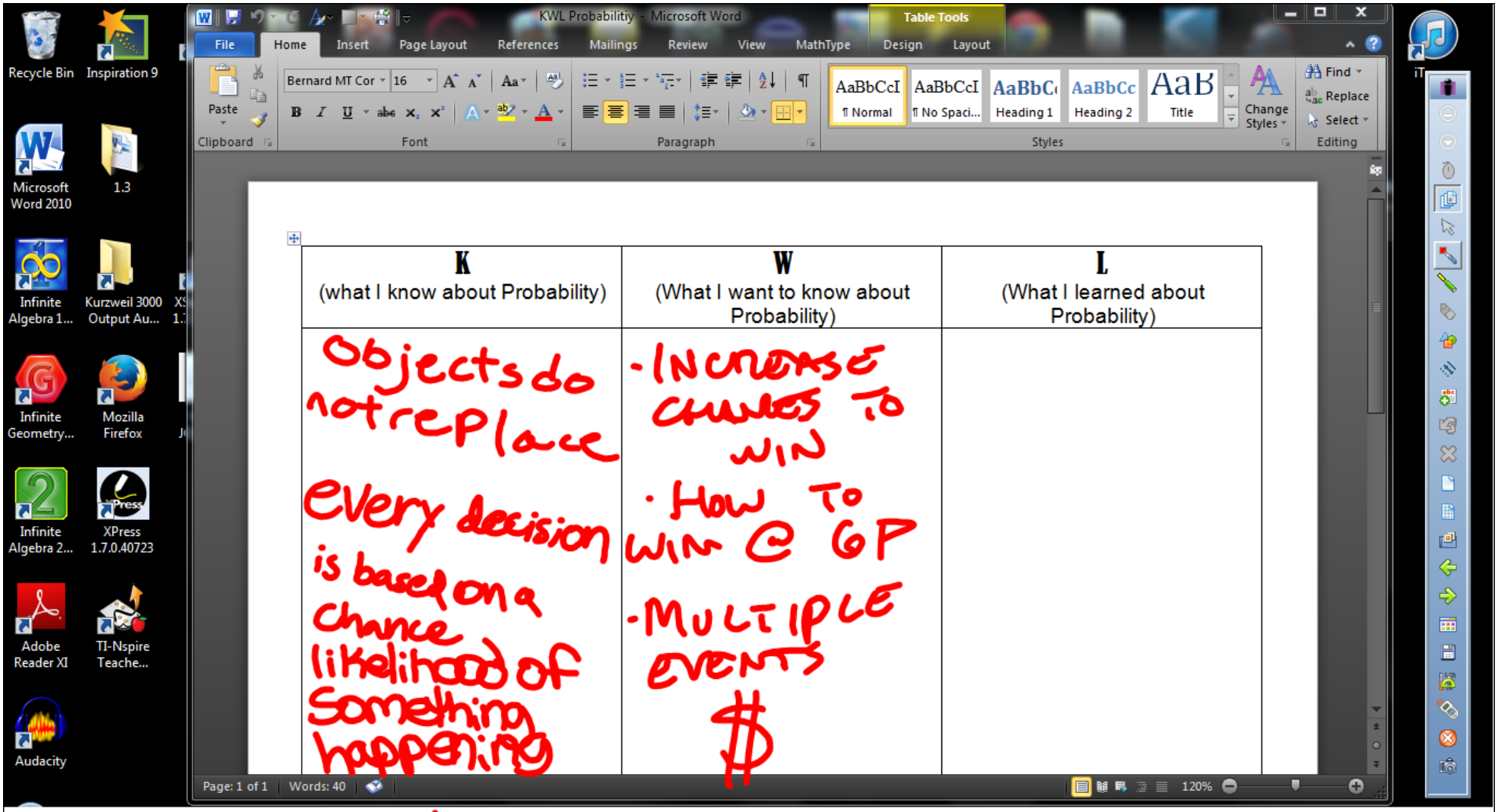

EXP. / THEORETICAL
PROBABILITY GUESS
HOW MANY TIMES.
/.
GAMES
GUESSING
ODDS

Probability Roulette - Microsoft Word

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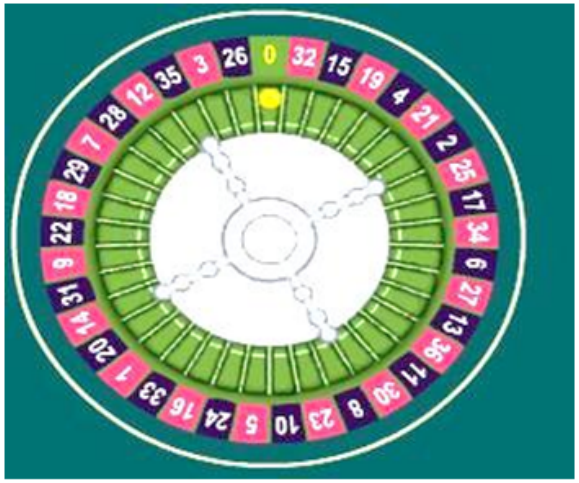
Unit 2: Probability

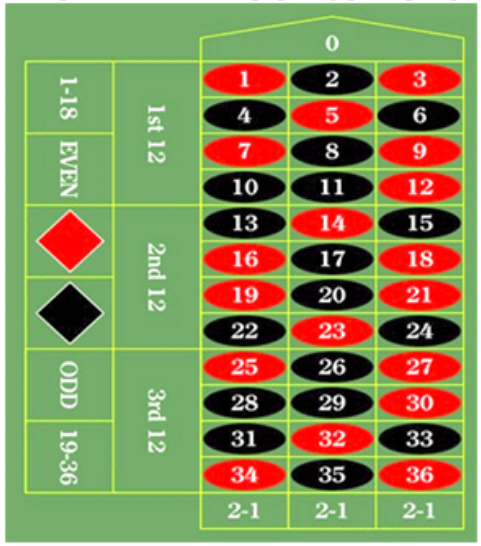
Probability and Money: Betting at Roulette

In the past you have learned about calculating probability of certain events. We are going to learn why probability matters by linking it to something we all care about- Money.

ROULETTE

Roulette is a game of chance played at casinos. The game is played by a ball being spun on a wheel of 37 numbers with alternating colors of red and black. Players make bets prior to the ball being spun by placing chips on the table shown to the right.

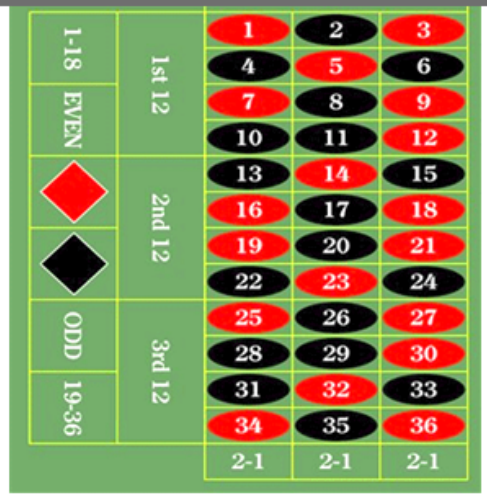




The Bets:

Bet	Payout
Single number	35 to 1
Two adjoining numbers (placed on line in between each)	17 to 1

Page: 1 of 4 Words: 888 90%



The Bets:

Bet	Payout
Single number	35 to 1
Two adjoining numbers (placed on line in between each)	17 to 1
"Street" Any 3 horizontal numbers (placed at end of line)	11 to 1
"Corner" (Placed in the intersection of the 4 numbers)	8 to 1
"Column" (Placed at bottom of the column)	2 to 1
"Dozen" Each set of 12 (placed to the right of the set)	2 to 1
1-18 or 19-36	1 to 1
Red or Black	1 to 1
Even or Odd	1 to 1

The payout refers to how much money you will get back if your bet is correct. For example if you bet $5 on Red and it is Red you will win $5. But if you bet $5 on the number 17 and it lands on the number 17 you will win $595. If you bet on something and do not win then you will lose the money that you initially bet.

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Page: 2 of 4 Words: 888 90%

Probability:

1) Find the probability of correctly guessing each bet. Put each answer as a percent. REMEMBER: Because of the zero there are 37 spaces on the wheel.

A) A single number	B) Two adjoining numbers	C) Street
$\frac{1}{37} = .027 = 2.7\%$	$\frac{2}{37} = .054$ 5.4%	$\frac{3}{37} = .081 = 8.1\%$
D) Corner	**E) Column**	**F) Dozen**
$\frac{4}{37} = 10.8\%$	$\frac{12}{37} = 32.4\%$	$\frac{12}{37} = 32.4\%$
G) 1-18 or 19-36	**H) Red or Black**	**I) Even or Odd**
$\frac{18}{37}$ 48.6%	$\frac{18}{37} = 48.6\%$	$\frac{18}{37} = 48.6\%$

Above is what is called **THEORETICAL PROBABILITY**. It refers to what we expect to happen when an event occurs, which in this case is spinning a roulette wheel.

2) Assume you play the game 40 times. How many times will you expect to win on each of the following events?

A) A single number	B) Two adjoining numbers	C) Street
$40(.027) = 1.08$ (1)	$40(.054) = 2$ TIMES	$40(.081) = 3$ TIMES
D) Corner	**E) Column**	**F) Dozen**
$40(.108) = 4$ TIMES	$40(.324) = 13$	
G) 1-18 or 19-36	**H) Red or Black**	**I) Even or Odd**
$40(.486) = 19$		

3) Now let's add the money factor into our game. Assume we are betting $1. Multiply the number of

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3) Now let's add the money factor into our game. Assume we are betting $1. Multiply the number of times you expect the event to occur with the payout of that item. It refers to what we expect to make/win based on what the probability is of the event happening.

A) A single number	B) Two adjoining numbers	C) Street
$35 × 1 = $35	$17 × 2 = $34	$11 × 3 = $33
D) Corner	**E) Column**	**F) Dozen**
$8 × 4 = $32	$2 × 13 = $26	
G) 1-18 or 19-36	**H) Red or Black**	**I) Even or Odd**
$1 × 19 = $19		

4) Now remember that we have to "pay to play". If we bet $1 on every play, and we play 40 times we can assume that we have to pay a total of $40. Subtract that number from how many times you expected each event to occur. But remember that you get back your $1 every time you win so add back $1 for the number of times you expected to win. This is called **EXPECTED VALUE**. (they may be negative ☺)

A) A single number B) Two adjoining numbers C) Street

Page: 2 of 4 Words: 888 90%

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4) Now remember that we have to "pay to play". If we bet $1 on every play, and we play 40 times we can assume that we have to pay a total of $40. Subtract that number from how many times you expected each event to occur. But remember that you get back your $1 every time you win so add back $1 for the number of times you expected to win. This is called **EXPECTED VALUE**. (they may be negative ☺)

A) A single number $35 - 40 + 1 = -4$

B) Two adjoining numbers $34 - 40 + 2 = -4$

C) Street $33 - 40 + 3 = -4$

D) Corner $32 - 40 + 4 = -4$

E) Column $26 - 40 + 13 = -1$

F) Dozen

G) 1-18 or 19-36

H) Red or Black

I) Even or Odd

$19 - 40 + K = (-2)$

WIN EXPECTED

HOW MUCH I SPENT TO PLAY

OF TIMES I WON SO I GOT MY BET BACK

5) Based on what you found in number 4 what are the theoretically best bets? If you could only make the same bet for 40 games in a row, which would you pick and why?

Now let us do an experiment. We are actually going to spin the wheel 40 times and see what the **EXPERIMENTAL PROBABILITY** is. Each person needs to pick a bet that they will do every single time for the next 40 spins. Write what your bet is below. Make sure to be specific- for example, don't just say Corner, say WHICH corner you are choosing

My Bet:_____

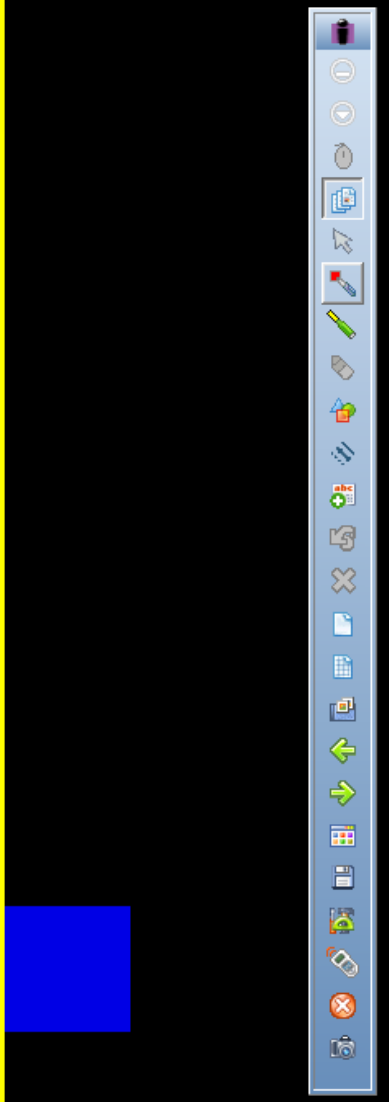
We will now spin the wheel 40 times. Record the results in the table below:

Page: 3 of 4 Words: 888 90%

$$y = mx + b$$

TRUE FOR ALL FUNCTIONS

y represents the output & x represents the input



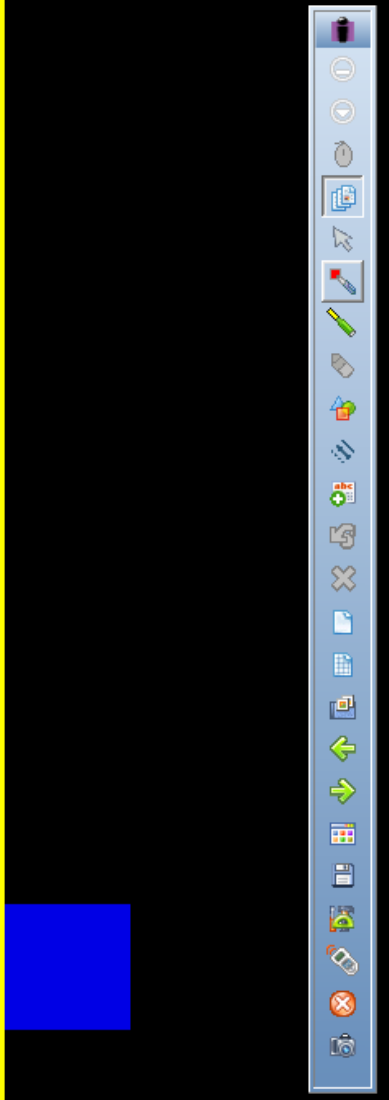
$y = mx + b$

y represents the output & x represents the input

m represents the slope

IN FRONT OF X

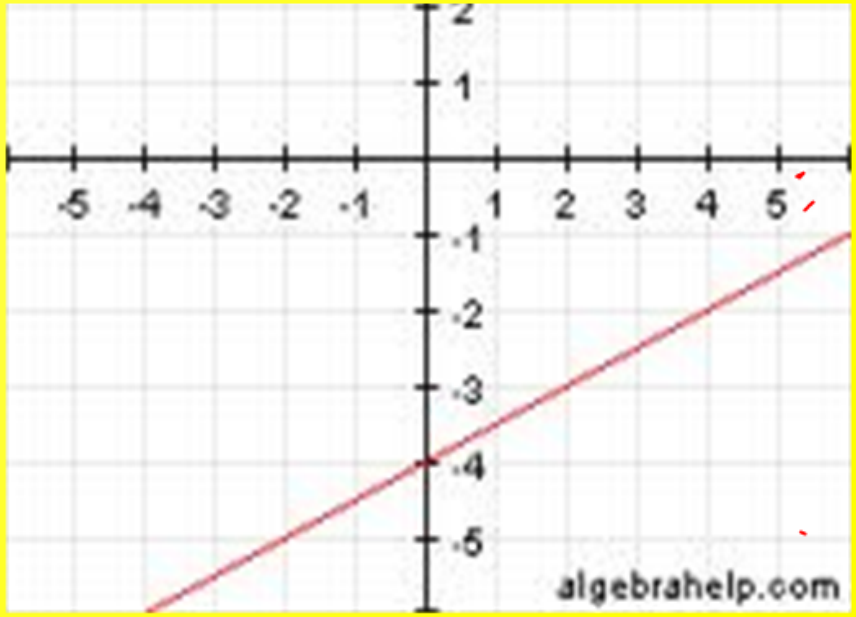
b represents the y-intercept



What's slope again??

$$m = \frac{rise}{run}$$

$$m = \frac{\text{UP/DOWN}}{\text{RIGHT}}$$



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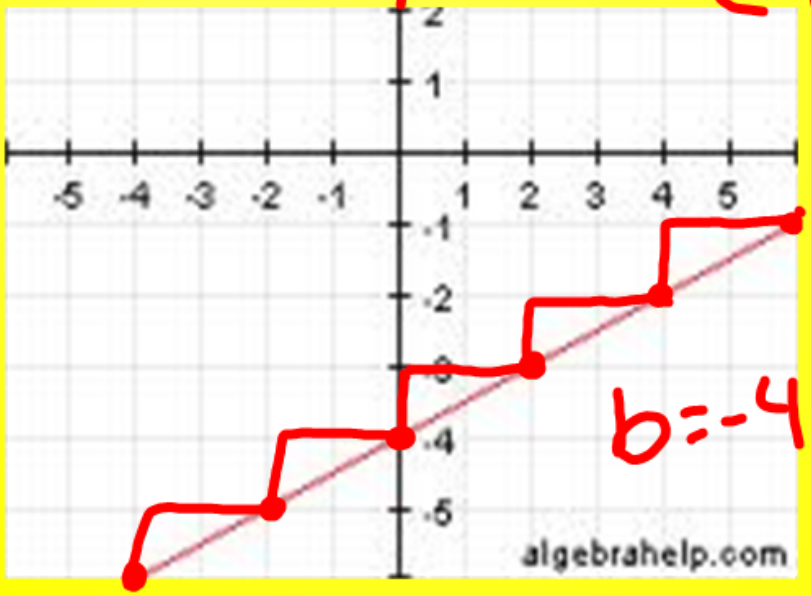
What is a y-intercept?

Where the line crosses the y-axis



(-2, -5)
(2, -3)
(4, -2)
(6, -1)
(-4, 6)

b=

$\frac{1}{2}$ ← STAIRS

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Graphing y = mx + b

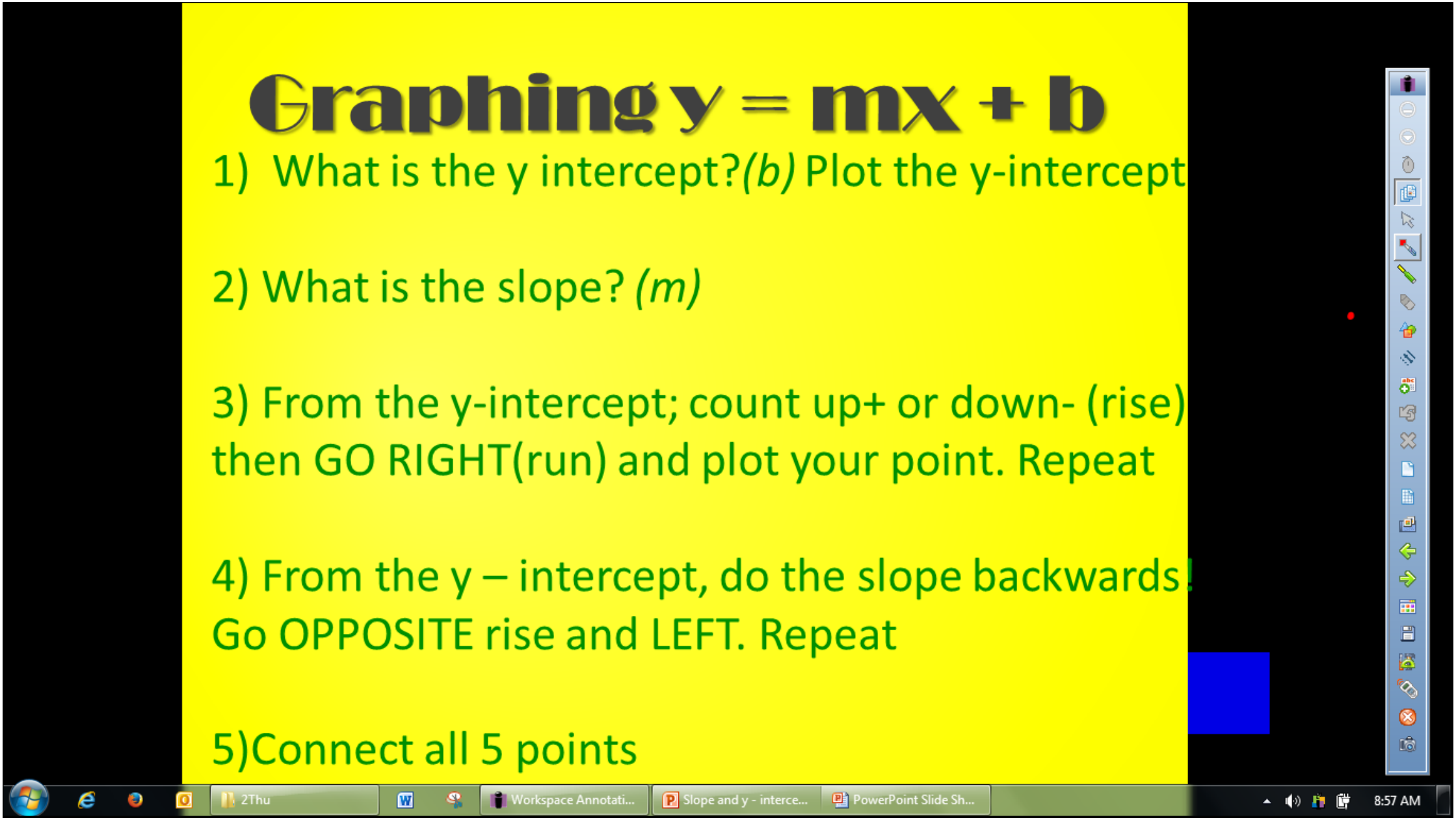
1) What is the y intercept?*(b)* Plot the y-intercept

2) What is the slope? *(m)*

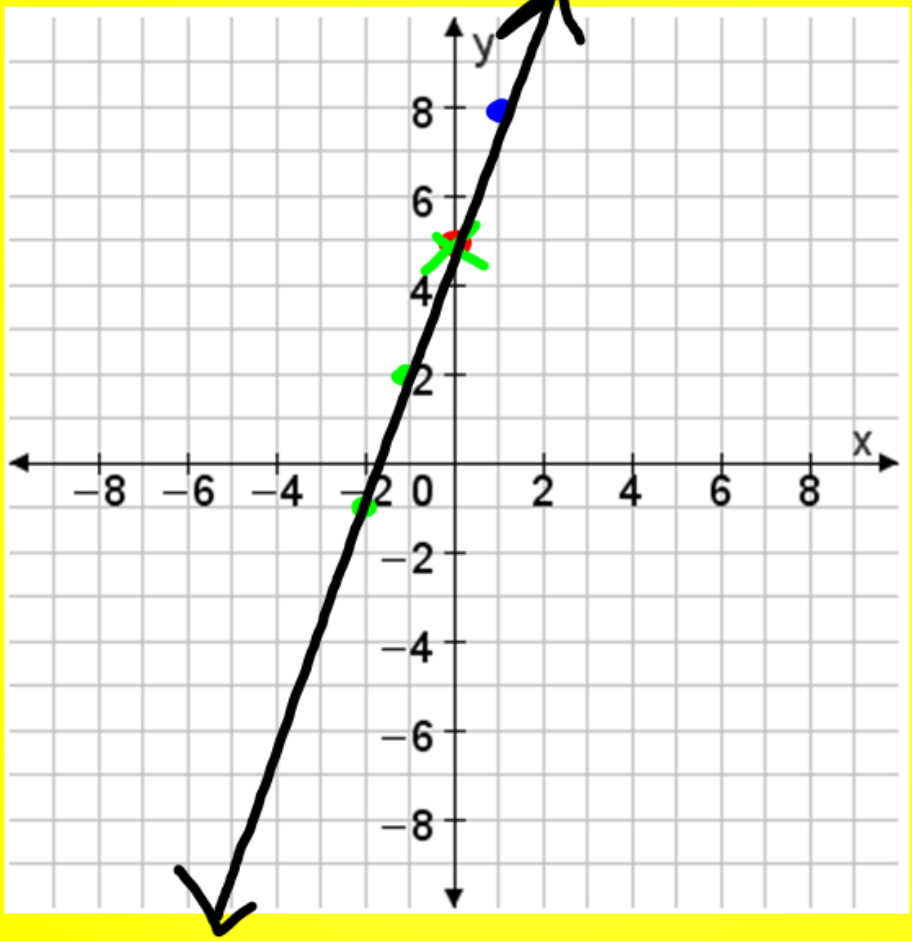
3) From the y-intercept; count up+ or down- (rise) then GO RIGHT(run) and plot your point. Repeat

4) From the y – intercept, do the slope backwards! Go OPPOSITE rise and LEFT. Repeat

5)Connect all 5 points



Graph the following



$y = 3x + 5$

$b = 5$

$m = 3$

$\frac{\text{UP/DOWN}}{\text{RIGHT}} = \frac{3}{1}$

UP 3 RIGHT 1

WHEN YOU HAVE A WHOLE # AS A SLOPE IT IS ALWAYS OVER 1

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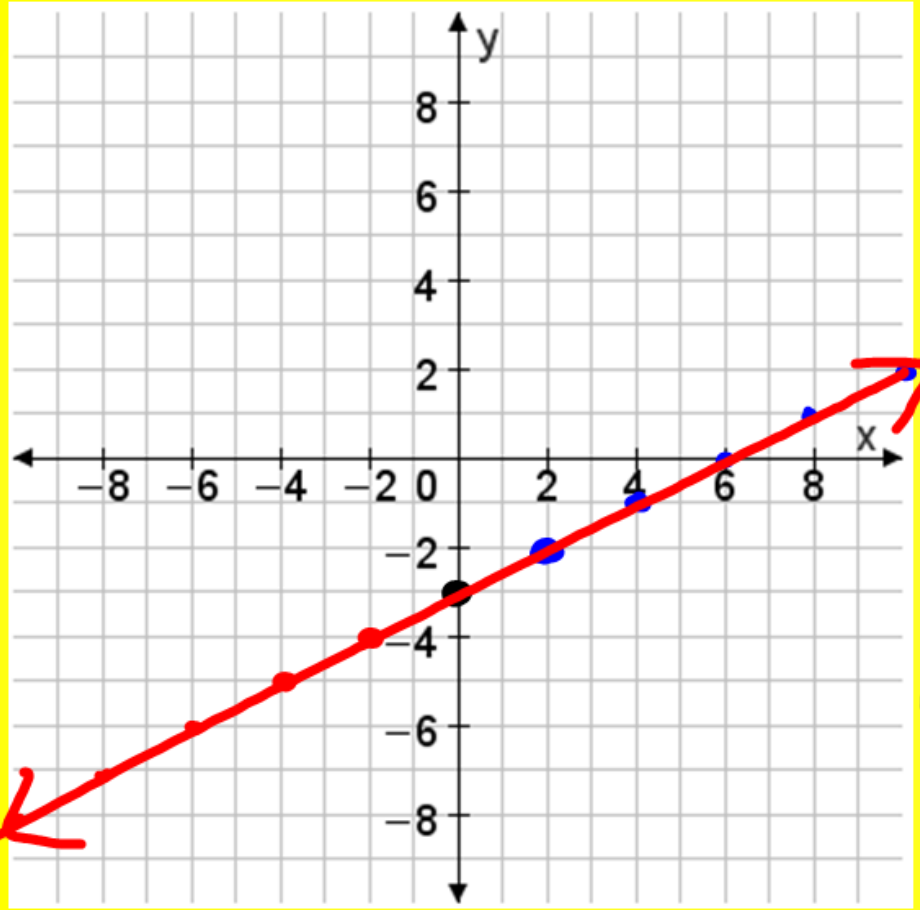
Graph the following



$$y = \frac{1}{2}x - 3$$

$b = -3$

$m = \frac{1}{2}$

$\frac{\text{UP/DOWN}}{\text{RIGHT}} = \frac{1}{2}$

UP 1 RIGHT 2

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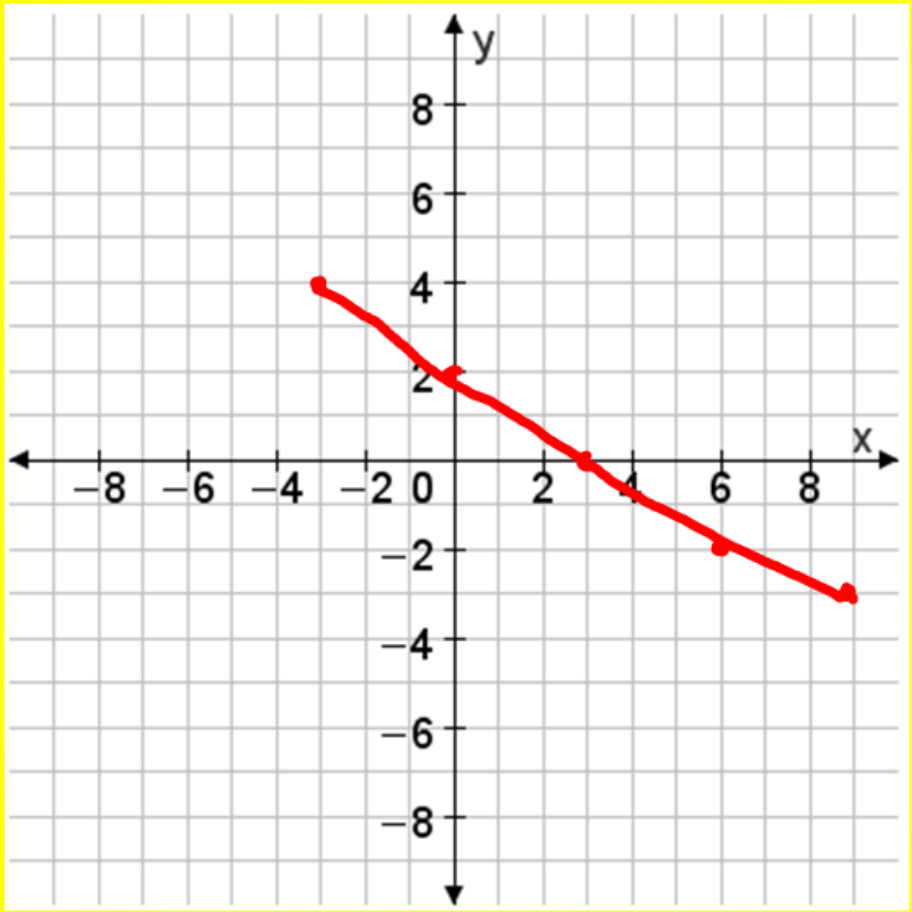
Graph the following



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

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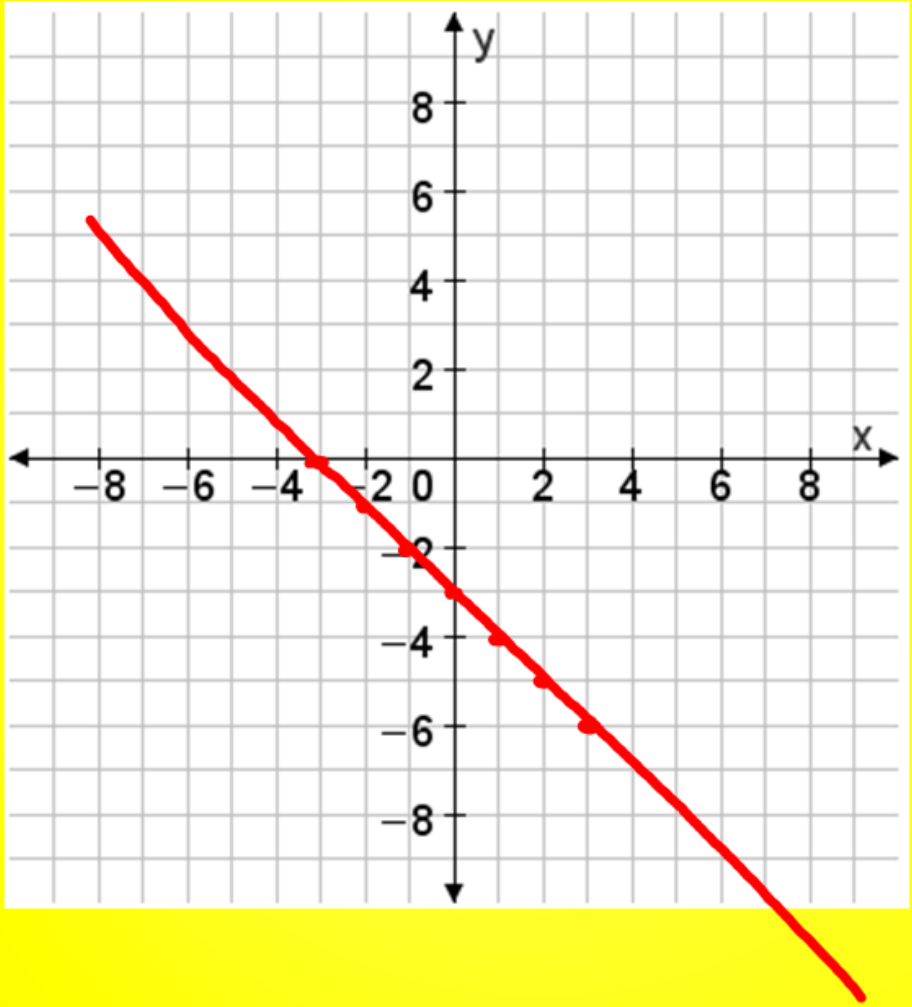
Graph the following



$y = -x - 3$

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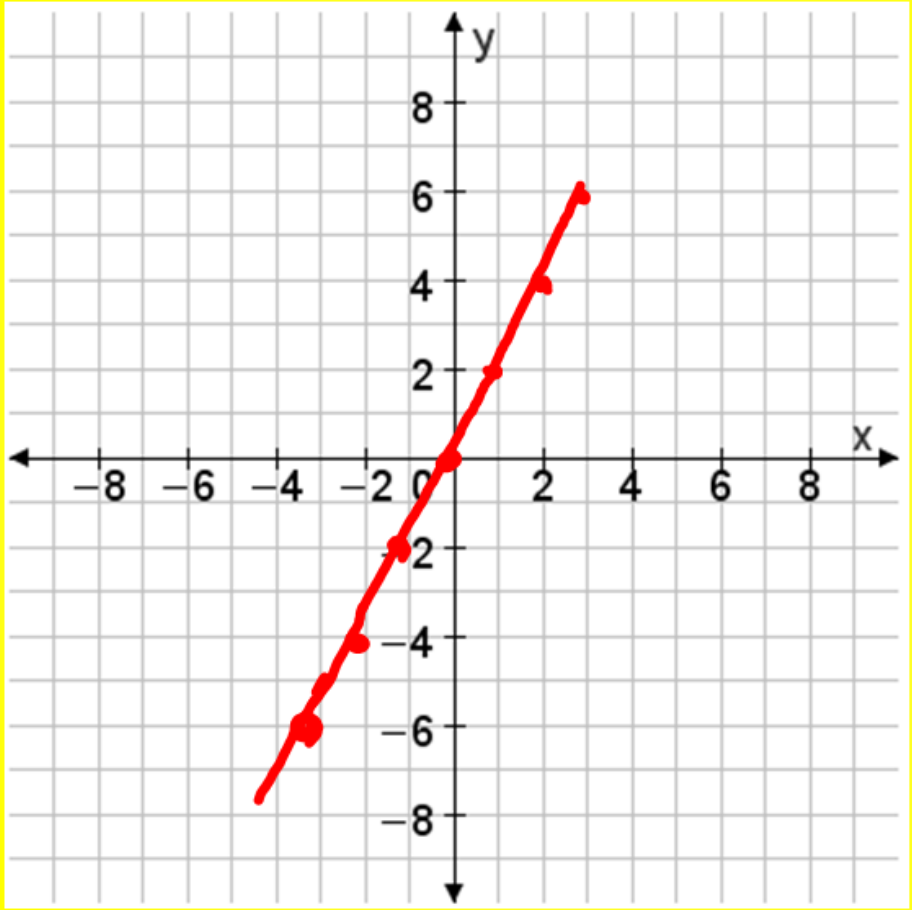
Graph the following



$y = 2x + 0$

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