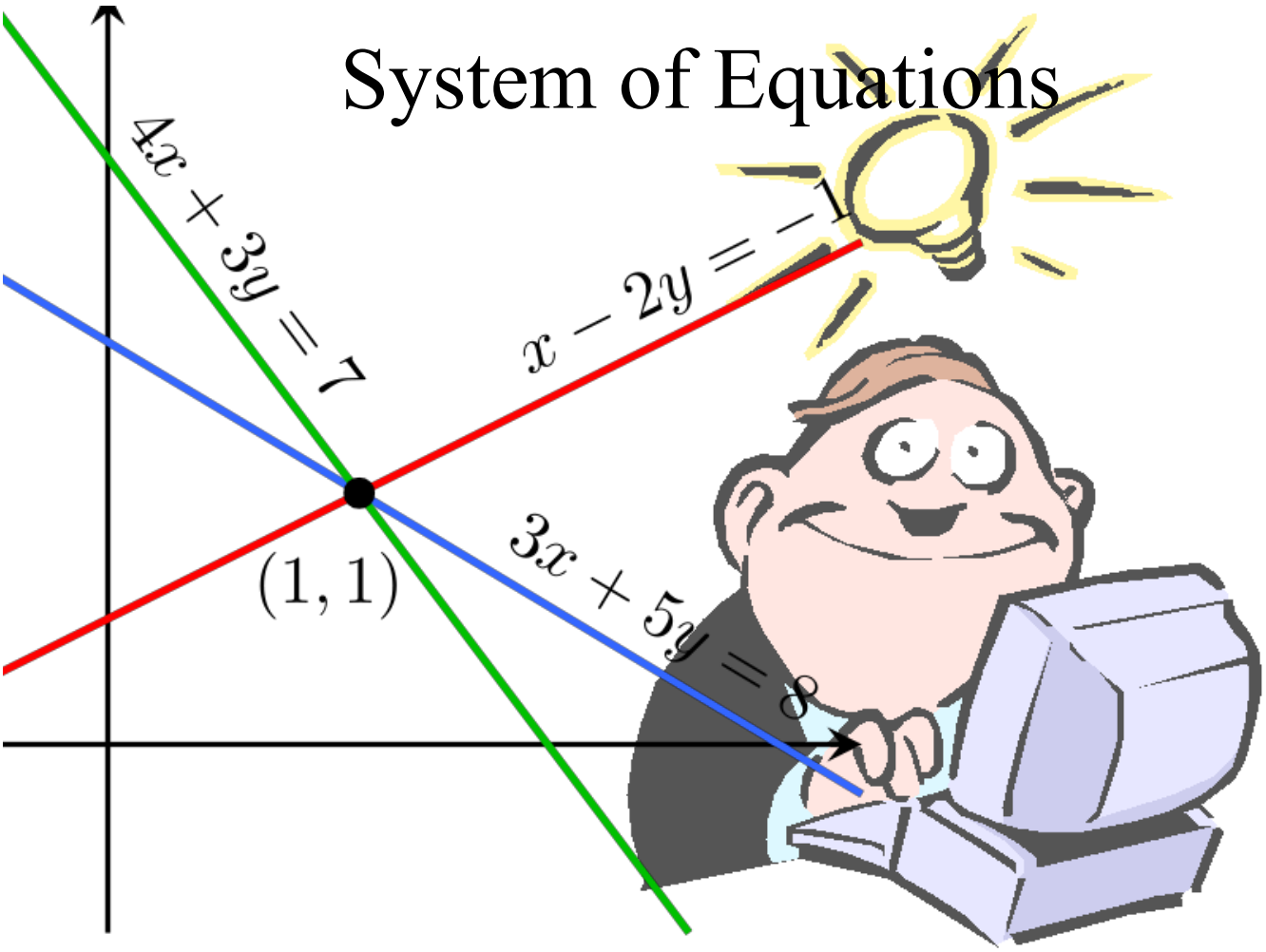
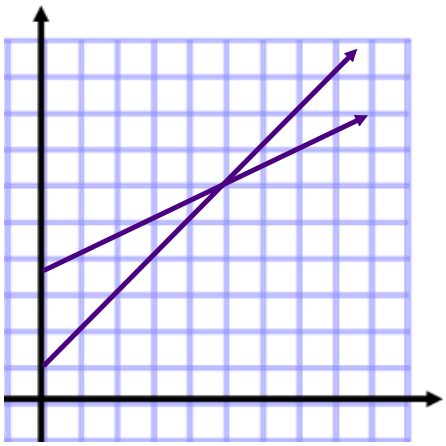
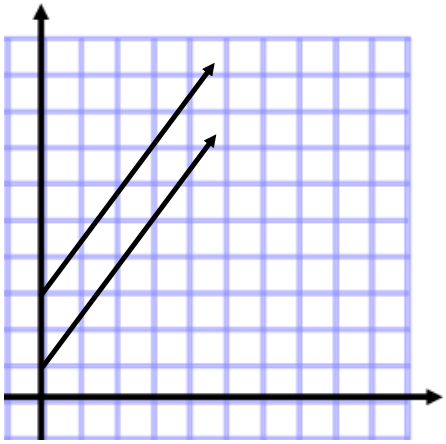
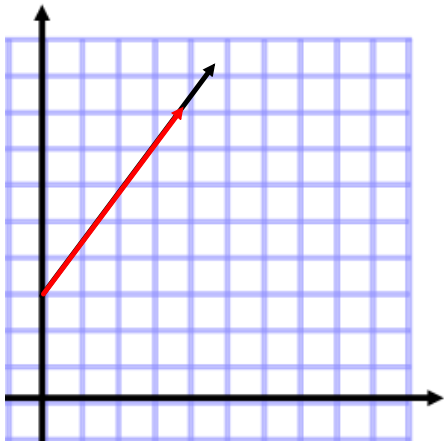
System of Equations



Can you see the solution??







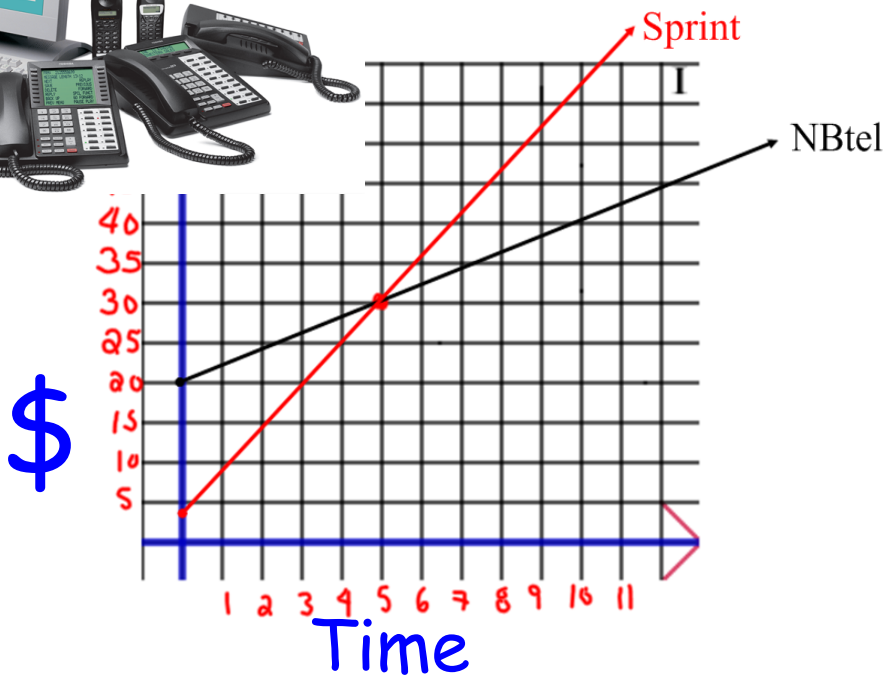
Internet Service

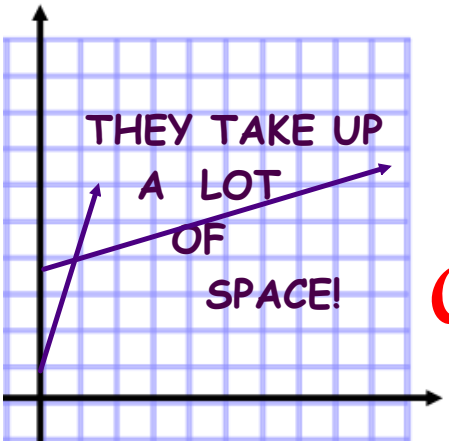
NBtel charges a monthly fee of $20.00, and an additional $2.00 per hour.
Sprint charges a monthly fee of $10.00, and an additional $4.00 per hour.

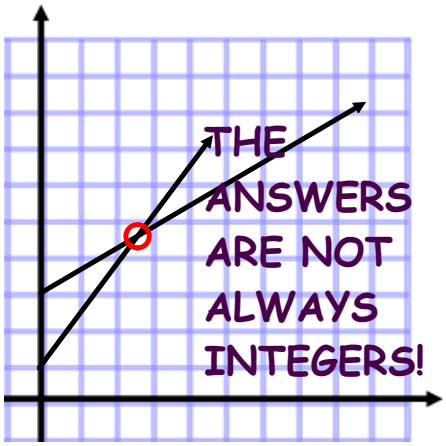
Equation??

NBtel _____

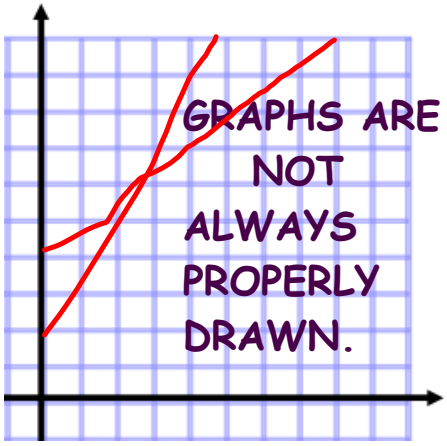
Sprint _____

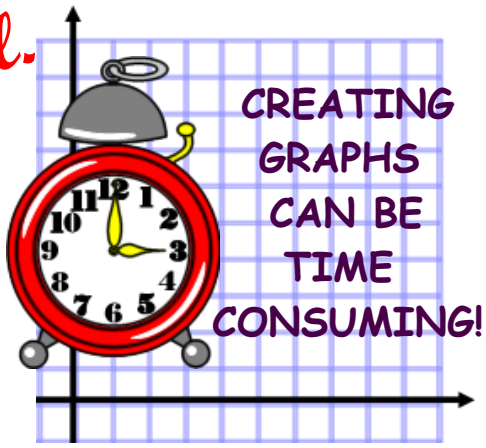






Graphing is not always practical.





There are other ways to solve Systems of Equations!

Elimination

Elimination is when you "eliminate" one of the variables.

Elimination by Addition

$+\ y - 2x = 5$ Equation #1

$+\ -y - 1x = 4$ Equation #2

$0 \quad -3x = 9$

$\frac{-3x}{-3} = \frac{9}{-3}$

$x = -3$

$5 + 4 = 9$

$-2x + (-1x)$

$-2x - 1x$

$= -3x$

$y - 2x = 5$

$y - 2(-3) = 5$

$y + 6 = 5$

$y = 5 - 6$

$y = -1$

Make sure the corresponding variables, constants and equal signs are lined up.

You must explain what you are doing.

Point of intersection is $(-3, -1)$

Elimination by Addition

Consider the system

$x - 2y = 5$ ←

$+ \quad 2x + 2y = 7$ ←

$3x \quad 0 = 12$ so.... $\frac{3x}{3} = \frac{12}{3}$

$x = 4$

$x + 2x \quad -2x + 2y = 0 \quad 5 + 7 = 12$

$x - 2y = 5$

$4 - 2y = 5$

$-2y = 5 - 4$

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

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

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

Point of Intersection

$(4, -0.5)$

Elimination by Addition

Consider the system

$$x - 2y = 5$$
$$+\ 2x + 2y = 7$$

Lets add both equations to each other

Elimination by Addition

x	$+ 3y$	$= 14$
$+ -x$	$+ 4y$	$= 7$
0	$+7y$	$=21$

Who would you eliminate??

$x+(-x)$ $3y+4y$ $14+(7)$

0 $=7y$

So... $\frac{7y}{7}=\frac{21}{7}$

$y=3$

$x+3y=14$

$x+3(3)=14$

$x+9=14$

$x=14-9$

$x=5$

Point of intersection

$(5,3)$

Elimination by Addition

$x + 3y = 14$

$-x + 4y = 7$

Elimination By Subtraction

$6x + 11y = -5$

$-1(6x + 9y = -3)$

$6x + 11y = -5$

$-6x - 9y = +3$

$\frac{2y}{2} = \frac{-2}{2}$

$y = -1$

$6x + 11(-1) = -5$

$6x - 11 = -5$

$6x = -5 + 11$

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

$x = 1$

Point of Intersection

$(1, -1)$

$x - 2y = -12$

$-2y - 6x = 16$

organize

$-2y + x = -12$

$-1(-2y - 6x = 16)$

$-2y + x = -12$

$+2y + 6x = -16$

$\frac{7x}{7} = \frac{-28}{7}$

$x = -4$

$-4 - 2y = -12$

$-2y = -12 + 4$

$\frac{-2y}{-2} = \frac{-8}{-2}$

$y = 4$

Point of Inters.

$(-4, 4)$

$-3x - 5y = 10$

$-1(-3x - 7y = 14)$

$-3x - 5y = 10$

$+3x + 7y = -14$

$\frac{2y}{2} = \frac{-4}{2}$

$y = -2$

Subtracting

$-3x - 5y = 10$

$-3x - 5(-2) = 10$

$-3x + 10 = 10$

$-3x = 10 - 10$

$\frac{-3x}{-3} = \frac{0}{-3}$

$x = 0$

Point

$(0, -2)$

Solve the following System of Equations

$3x + y = 0$

$(-x + y = 8)\times 3$

$3x + y = 0$

$-3x + 3y = 24$

$\frac{4y}{4} = \frac{24}{4}$

$y = 6$

Make sure the corresponding variables, constants and equal signs are lined up.

You must explain what you are doing.

$3x + 6 = 0$

$\frac{3x}{3} = \frac{-6}{3}$

$x = -2$

Point.

$(-2, 6)$

Solve the following System of Equations

$(-2x + y = -7)\ -2$

$-4x + 10y = -6$

$4x - 2y = 14$

$-4x + 10y = -6$

$\frac{8y}{8} = \frac{8}{8}$

$y = 1$

Make sure the corresponding variables, constants and equal signs are lined up.

You must explain what you are doing.

$-2x + 1 = 7$

$-2x = 7 - 1$

$\frac{-2x}{-2} = \frac{6}{-2}$

$x = -3$

Point

$(-3, 1)$

Solve the following System of Equations

$3\ (-2x + 8y = 2)$

$+2\ (3x - 3y = 15)$

$-6x + 24y = 6$

$+6x - 6y = 30$

$\frac{18y}{18} = \frac{36}{18}$

$y = 2$

$(7, -2)$

Make sure the corresponding variables, constants and equal signs are lined up.

You must explain what you are doing.

$-2x + 8(2) = 2$

$-2x + 16 = 2$

$-2x = 2 - 16$

$\frac{-2x}{-2} = \frac{-14}{-2}$

$x = 7$

Try these:

1.

$$x - 2y = 5$$
$$+\ 2x + 2y = 7$$

2.

$$6x + 11y = -5$$
$$6x + 9y = -3$$

3.

$$x + 2y = 6$$
$$3x + 3y = -6$$

1.

- Variables are lineup.

$$\begin{array}{rrr} 1x & -2y & = 5 \\ +2x & +2y & = 7 \\ \hline 3x & & = 12 \end{array}$$

$\frac{3x}{3} = \frac{12}{3}$ $x = 4$

6 + 4 = 10

$-2y + (+2y)$
$-2y + 2y$
$= 0$

Lets add both equations to each other

solve for x

ANS: (4, y)

x= 4

Now solve for y (HOW???)

- sub the value of x into one of the equations and solve for y

$x - 2y = 5$

$+4 - 2y = 5 - 4$

$-2y = 1$

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

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

$-\frac{1}{2} - \frac{1}{2} \quad \frac{1}{-2}$

intersection point (4, - 0.5)

2.

Careful you are subtraction all of the second
(switch all signs on t second equation)

$$6x + 11y = -5$$
$$-6x - 9y = +3$$
$$2y = -2$$

$$y = -1$$

solve for x

$$6x + 11y = -5$$
$$6x + 11(-1) = -5$$
$$6x - 11 = -5$$
$$6x = -5 + 11$$
$$6x = 6$$
$$x = 1$$

Intersection (1, -1)

3.

Consider the system

$$3x + 6y = 18$$
$$-3x - 3y = +6$$

Now subtract the equations

$$3y = 24$$

$$y = 8$$

Sub into equation 1 (original) or the above

$$x + 2y = 6$$
$$x + 2(8) = 6$$
$$x + 16 = 6$$
$$x = 6 - 16$$
$$x = -10$$

$$(-10, 6)$$

STOP