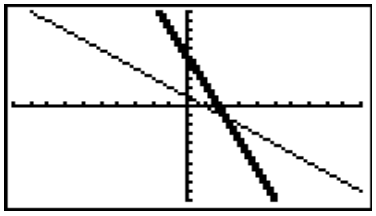
SOLVING LINEAR SYSTEMS USING SUBSTITUTION

The substitution method is another way to solve a linear system using ALGEBRA! The method requires you to write both equations in the slope *y*-intercept form.

$$y = mx + b$$

Recall: Solving a linear system means finding the POINT OF INTERSECTION.



To find the POINT OF INTERSECTION (*x*, *y*):
FIRST find the *x* component (STEP 1)
THEN find the *y* component (STEP 2)

METHOD FOR STEP 1 – finding the *x* component of the POI (*x*, *y*)

1 Make sure both equations are in $y = mx + b$ form; if not, rearrange them into this form.

2 Both equations equal y, so they are equal to each other!
So….set the right side of each equation equal to each other!!!.

3 Solve for *x*.

EXAMPLES: Solve for *x* for the following linear systems:

$y = 2x + 7$
$y = -x - 11$

$6x + 2y = 12$
$4x - y = 5$

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

METHOD FOR STEP 2 – finding the *y* component of the POI (*x*, *y*)

1 Use the equation of the line in the $y = mx + b$ form

2 Substitute the value of x (from STEP 1) into that equation

3 Solve for y

EXAMPLES - Solve the following equations by substituting in for the x value

a) $y = x + 5$ when $x = 2$

b) $y = 6x - 3$ when $x = -5$

c) $y = 3x + 8$ when $x = 7$

d) $y = -9x - 25$ when $x = -4$