

A system of Linear Inequalities.

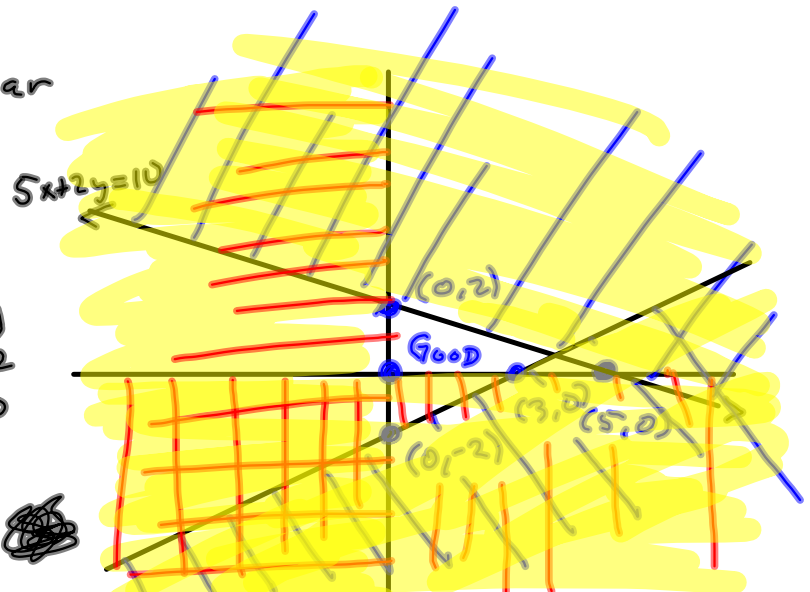
$$2x + 5y \leq 10$$

$$2x - 3y \leq 6$$

$$x \geq 0$$

$$y \geq 0$$

x	y
0	-2
3	0



$$2x + 5y \leq 10$$

x	y
0	2
5	0

Test (0,0).

$$2(0) + 5(0) \leq 10?$$

$$0 \leq 10?$$

Yes. (0,0) Good

$$2x - 3y \leq 6$$

x	y
0	-2
3	0

$$2(0) - 3(0) \leq 6?$$

$$0 \leq 6?$$

Yes (0,0) Good.



Owie!

Graph  $g(x) = -\sqrt{3-x} + 7$        $f(x) = \sqrt{x}$

$3-x = -(-3+x) = -(x-3)$

- $f(-x)$  ① H-reflect
- $f(x+c)$  ② H-shift
- $a f(x)$  ③ V-reflect
- $f(x)+c$  ④ V-shift

$\sqrt{-x}$   
 $\sqrt{-(x-3)}$   
 $-\sqrt{-(x-3)}$   
 $-\sqrt{-(x-3)} + 7 = g(x)$

①  $\sqrt{x} = f(x)$

②  $\sqrt{-x} = f(-x)$        $(x,y) \rightarrow (-x,y)$

③  $\sqrt{-(x-3)} = f(-(x-3))$        $(x,y) \rightarrow (x+3,y)$

④  $-\sqrt{-(x-3)} = -f(-(x-3))$        $(x,y) \rightarrow (x,-y)$

⑤  $-\sqrt{-(x-3)} + 7 = -f(-(x-3)) + 7$        $(x,y) \rightarrow (x,y+7)$

→ 5 graphs, showing each move.

## Systems of Linear Equations

Solve

$$2x + 5y = 10$$

$$2x - 3y = 6$$

what's the slope of  $2x + 5y = 10$ ?

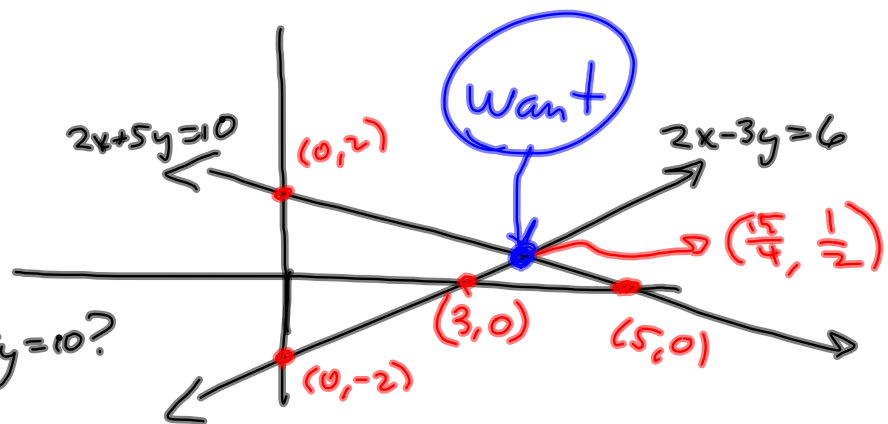
$$-\frac{2}{5}$$

$$5y = -2x + 10$$

$$y = \frac{-2x + 10}{5}$$

$$y = -\frac{2}{5}x + \frac{10}{5}$$

$$m = -\frac{2}{5}$$



SOLUTION METHODS:

- ① Substitution
- ② Elimination

ⓐ Solve for one variable in one eqn.  
 Send that requirement to the other eqn.  
 Find both variables, from that.

✓  $y = \frac{-2x+10}{5}$  from  $2x+5y=70$ .

Send this to  $2x+3y=66$

$2x - \left( \frac{2x+10}{5} \right) = 66$

$2x - \frac{3x(2x+10)}{5} = 66$

$(2x) \left( \frac{5}{5} \right) - \frac{3x(2x+10)}{5} = \left( 66 \right) \left( \frac{5}{5} \right)$

Clean  
 Erase  
 Simplify  
 from  
 work.

$\frac{10x}{5} - \frac{3x(2x+10)}{5} = \frac{330}{5}$

$10x - 3x(2x+10) = 330$

$10x + 66x - 30 = 330$

$148x - 30 = 330$

$148x = 600$

$x = \frac{600}{148} = \frac{300}{74} = \frac{150}{37}$

$y = \frac{-2x+10}{5}$

$y = \frac{-2 \left( \frac{150}{37} \right) + 10}{5}$

$y = \frac{-\frac{300}{37} + 10}{5} = \frac{-\frac{300}{37} + \frac{370}{37}}{5} = \frac{\frac{70}{37}}{5} = \frac{70}{185} = \frac{14}{37}$

Substitution is NICE when you start with a variable by itself (or with a coefficient of '1').

$$\begin{array}{l} y = 2x + 3 \\ x - 2y = 7 \end{array}$$

Nice.  $y$  is already alone.

$$x - 2(2x + 3) = 7$$

$$\begin{array}{l} y = 2x + 3 \\ y = 2\left(-\frac{13}{3}\right) + 3 \end{array}$$

Check:

$$\begin{array}{l} x - 2y = 7 \\ -\frac{13}{3} - 2\left(-\frac{17}{3}\right) = 7 \\ \frac{-13 + 34}{3} = \frac{21}{3} = 7 \quad \checkmark \end{array}$$

$$x - 4x - 6 = 7$$

$$-3x - 6 = 7$$

$$-3x = 13$$

$$x = -\frac{13}{3}$$

$$= -\frac{26}{3} + \frac{9}{3}$$

$$= -\frac{17}{3} = y$$

These solutions should be reported as ordered pairs:  $\left(-\frac{13}{3}, -\frac{17}{3}\right)$  } Apt. in the plane.

Solution Set:  $\left\{\left(-\frac{13}{3}, -\frac{17}{3}\right)\right\}$

You should be starting problems in S<sup>4</sup>.1  
by rest of week.

Read Ahead - Copy Down Highlights,  
Ask Questions