Warm Up

1) Solve the nonlinear system.

$y=x^2-6x+11$

$y=-x+7$

$-x+7=x^2-6x+11$
$+x \quad -7 \qquad +x \quad -7$
$0=x^2-5x+4$
$0=(x-4)(x-1)$
$x=4 \quad x=1$

$y=-4+7$
$y=3$

$y=-1+7$
$y=6$

$(4,3) \quad (1,6)$

2) Solve the nonlinear system.

$x^2+y=-5$

$\cancel{x-y=-3}$

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

$x^2+x=-8$
$x^2+x+8=0$
$x=\dfrac{-1\pm\sqrt{1^2-4(1)(8)}}{2(1)}$

-31

*Check HW

*Go over DLT's

Nov 19-3:18 PM

*Green WS

*Green Pass the Problem Cards

http://www.online-stopwatch.com/countdown-timer/

$y = -x^2 - 2x - 1$

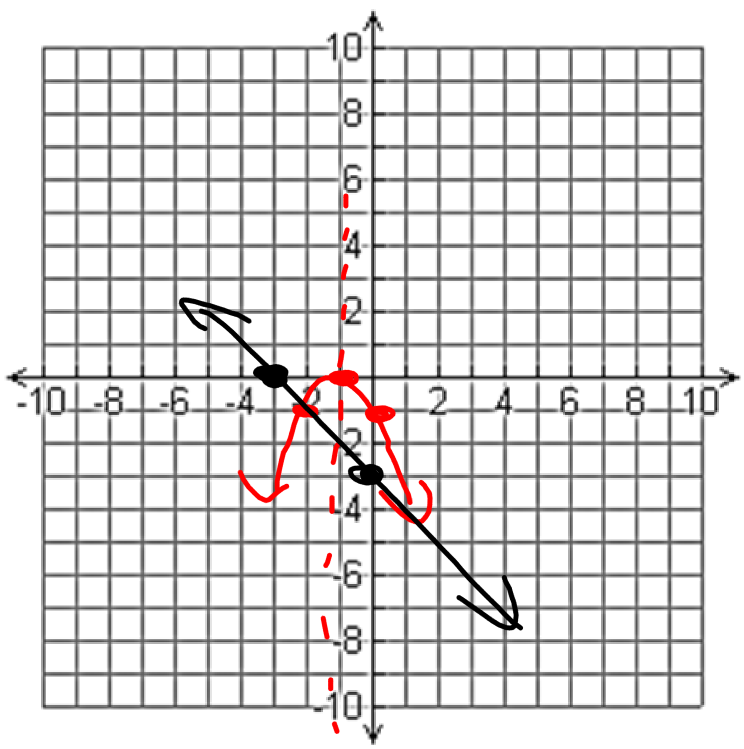
$x + y = -3$

y-intercept $(0, -1)$

$x = -\frac{b}{2a}$

$x = \frac{-(-2)}{2(-1)} = \frac{2}{-2} = -1$

-1



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$x - y = 2$

$x^2 + y^2 = 10$

10

$P = 2l + 2w \qquad A = l \cdot w$

$16 = 2l + 2w \qquad \frac{15}{w} = \frac{l \cdot \cancel{w}}{\cancel{w}}$

$16 = 2\left(\frac{15}{w}\right) + 2w$

$w\left(16 = \frac{30}{w} + 2w\right)_2 \qquad 2w^2 - 16w + 30 = 0$

$16w = 30 + 2w^2$

$-16w \qquad -16w$

Review

13. Solve the following non - linear system.

$$\begin{cases} y = |x-3| + 1 \\ x + 2y = 8 \end{cases}$$

A) (0, 4) B) (4, 2) C) (4, 2) and (0, 4) D) they don't intersect E) None of these

14. An equation is shown, where *a*, *b*, and *c* are integers.

$y = a(x - b)^2 + c$

Brian claims that this equation will always have two roots.

Scott claims that this equation will always have zero roots.

Which of the following equations shows that both Brian and Scott are incorrect?

A) $y = \dfrac{1}{2}(x + 5)^2$

B) $y = \dfrac{-1}{3}(x + 3)^2 + 8$

C) $y = 3(x - 6)^2 + 3$

D) $y = -(x - 3)^2 - 4$

E) None of these

Review

7. Which of the following is NOT a solution of $(x + 2)(x - 4)(x + 1)(x - 3) = 0$?

A) -1 B) 3 C) -3 D) 4 E) None of these

8. Factor the polynomial completely: $x^3 - 5x^2 - 4x + 20$

A) $(x^2 - 4)(x - 5)$ B) $(x + 2)(x - 2)(x - 5)$ C) $(x + 2)(x + 2)(x - 5)$

D) not factorable E) None of these

9. Solve the equation: $5x^6 - 20x^2 = 0$

A) $x = 0, \sqrt{2}, -\sqrt{2}, i\sqrt{2}, -i\sqrt{2}$

B) $x = 0, 2, -2, 2i, -2i$ C) $x = 4, -4$

D) $x = 0$ E) None of these

Chapter 3
Advanced Systems Analysis
(3.3) Linear Inequalities and Linear Programming

Nov 22-10:06 PM

Graphing a system of linear inequalities

GRAPH, TEST, SHADE

- $<$ or $>$ use a dashed line

  $\leq$ or $\geq$ use a solid line

- Test a point (usually (0,0)) to determine shading

- Shade darker the overlapping regions.

  This is the solution to the system.

- If regions don't overlap-no solution

Ex: $\cancel{y \geq -3x-1}$

$\cancel{y < x+2}$

$0 < 4(0)-2$

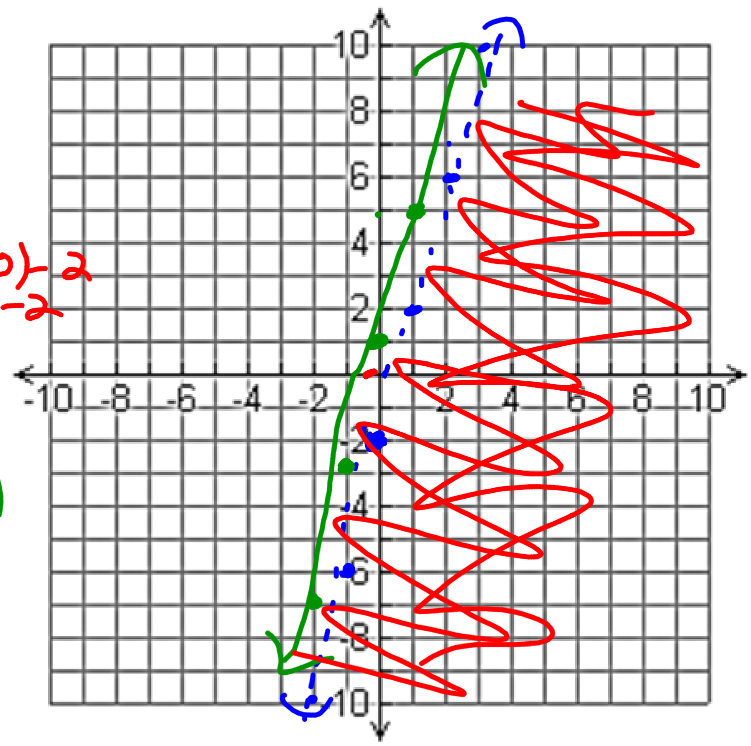
$0 < -2$

1. $y < 4x - 2$

$y \leq 4x + 1$

$0 \leq 4(0) + 1$

$0 \leq 1$



Nov 16-10:22 AM

y< x-2

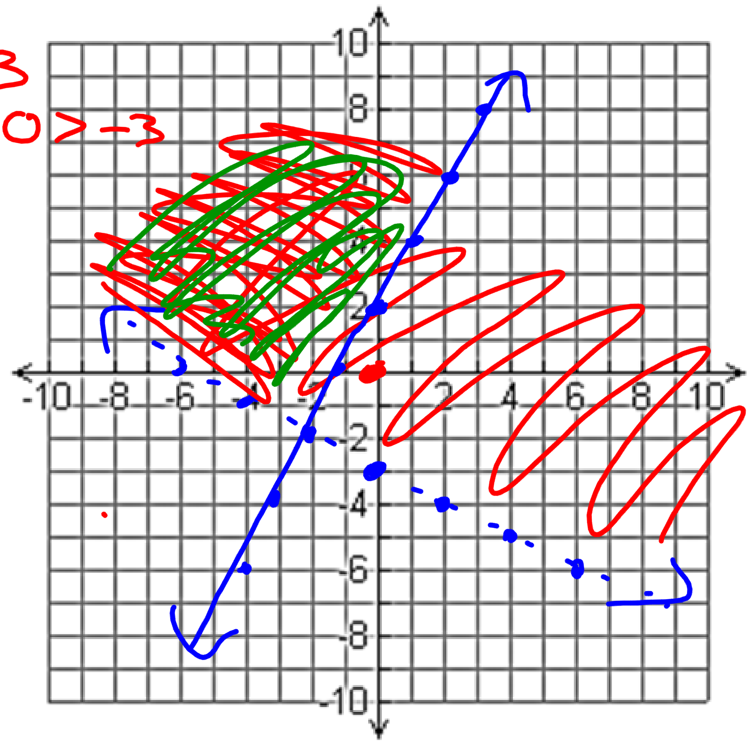
$0 > -\frac{1}{2}(0)-3$

5) $y > -\frac{1}{2}x - 3$ $\quad 0 > -3$

$y \geq 2x + 2$

$0 \geq 2(0) + 2$

$0 \geq 2$



~~$x>2$~~

~~$y>0$~~

(8) $2x-5y \geq -35$

$-2x \qquad\qquad -2x$

$-5y \geq -2x-35$

$\overline{-5} \qquad \overline{-5}$

$y \leq \frac{2}{5}x+7$

$0 \leq \frac{2}{5}(0)+7$

$13x+5y \geq -40$

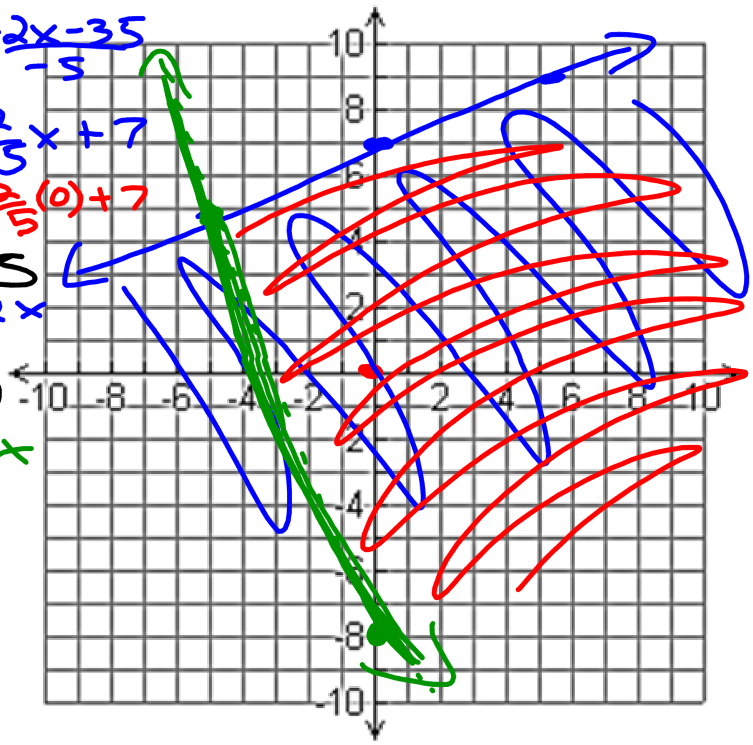
$-13x \qquad\qquad -13x$

$5y \geq -13x-40$

$\overline{5} \qquad \overline{5}$

$y \geq -\frac{13}{5}x-8$

$0 \geq -8$

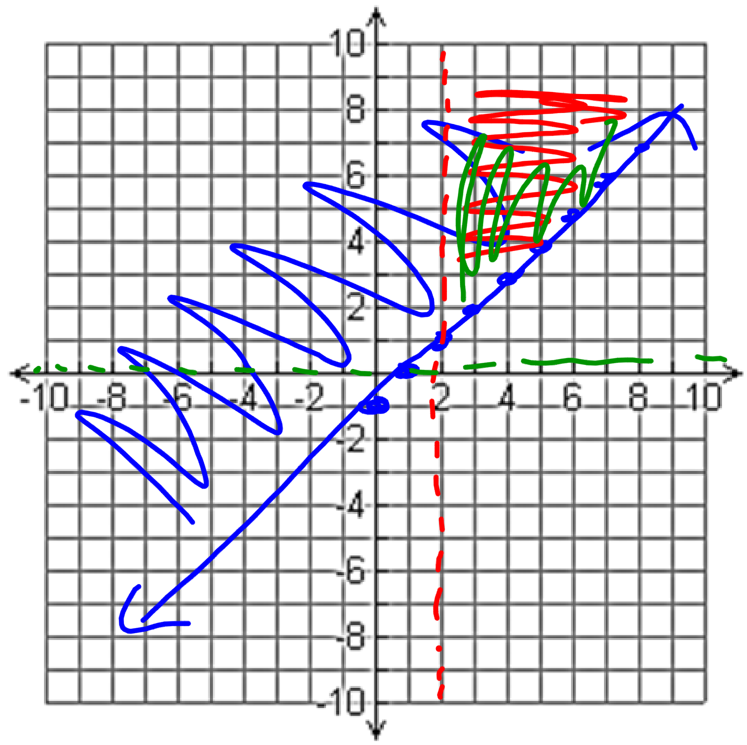


$0 \geq -1$

Ex: $y \geq x-1$

$x > 2$

$y > 0$



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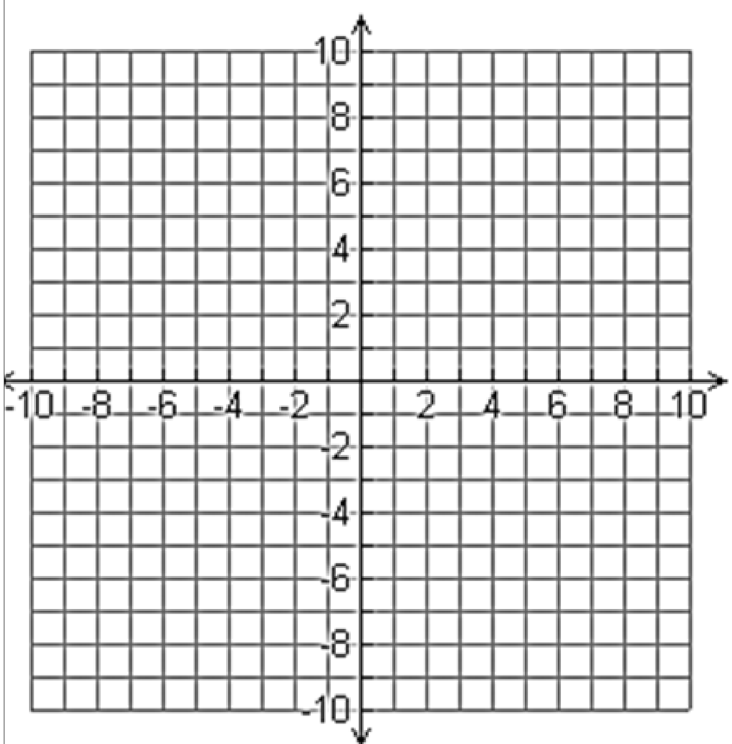
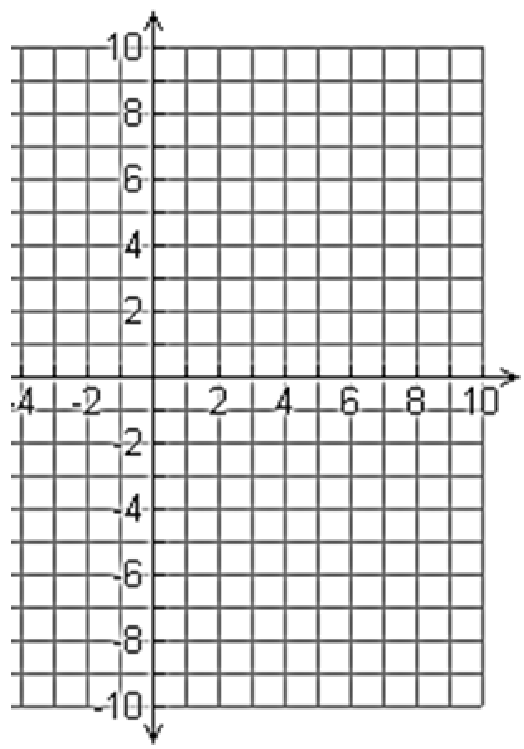
*Practice ws on graphing inequalities.





Linear Programming

What is it?
A mathematical technique for maximizing (revenue) or minimizing (costs) of a linear function of several variables

Who uses it?
Computer Programmers

Restaurants (menu planning - optimizes meal production and increases restaurant profits)

Coca - Cola (optimal production in bottling plants while keeping costs as low as possible = more money in their pocket)

Economics & Business (planning, routing, scheduling, assignments, and design)

Cell Phone Companies (network flow problems and fixing them)

Nov 20-6:45 AM

$C = 3x + 2y$

Find the max and min of the objective function.

$x \geq 0$

$y \geq 0$

$x + 2y \leq 4$

$0 + 2(0) \leq 4$

$0 \leq 4$

x y

(0, 2)

$C = 3(0) + 2(2)$

$C = 4$

(0, 0) min

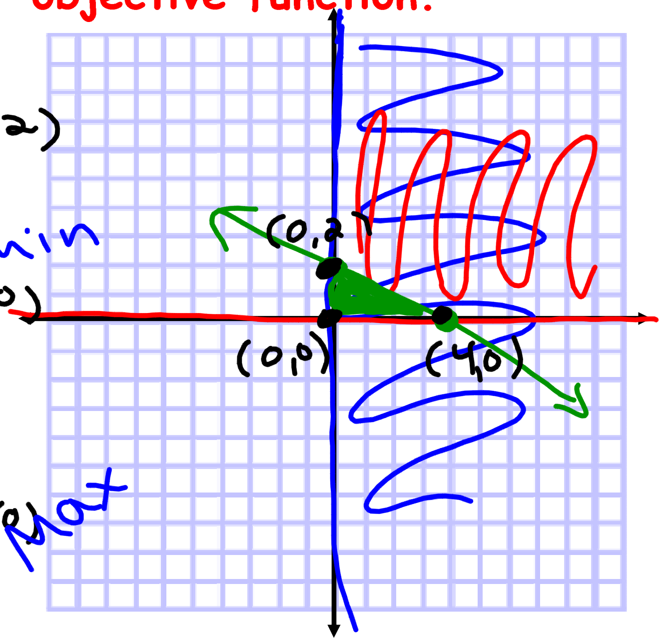
$C = 3(0) + 2(0)$

$C = 0$

(4, 0)

$C = 3(4) + 2(0)$ Max

$C = 12$



The graph of the constraints is called the feasible region.

Objective Quantity

-a value to be optimized

-looking for its maximum or minimum value

Constraints

-restrictions on the objective quantity

Feasible Region

-the set of all points that make all of the constraints "true" k

$$C = -2x + 4y$$

$x \geq 0$

$y \geq 0$ $y = 0$

$2x + y \geq 5$

$-2x$ $-2x$

$y \geq -2x + 5$

$0 \geq -2(0) + 5$

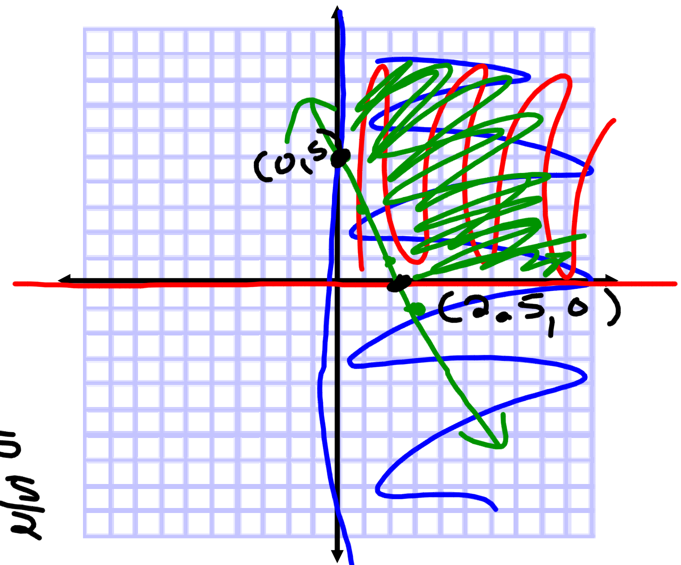
$6 \geq 5$

$2x + y = 5$

$2x + 0 = 5$

$2x = 5$

$x = \frac{5}{2}$



If the feasible region is unbounded, then there does not have to be a max or a min.

1) Define Variables

x:

y:

2) Objective Function

(Cost or Profit)

3) Constraint Equations

4) Graph

5) Find Intersection Points

6) List Points

7) Plug Points into Constraint Function

Homework:
Finish green ws

Finish graphing inequalities ws

Finish Linear programming packet

Nov 22-9:55 PM