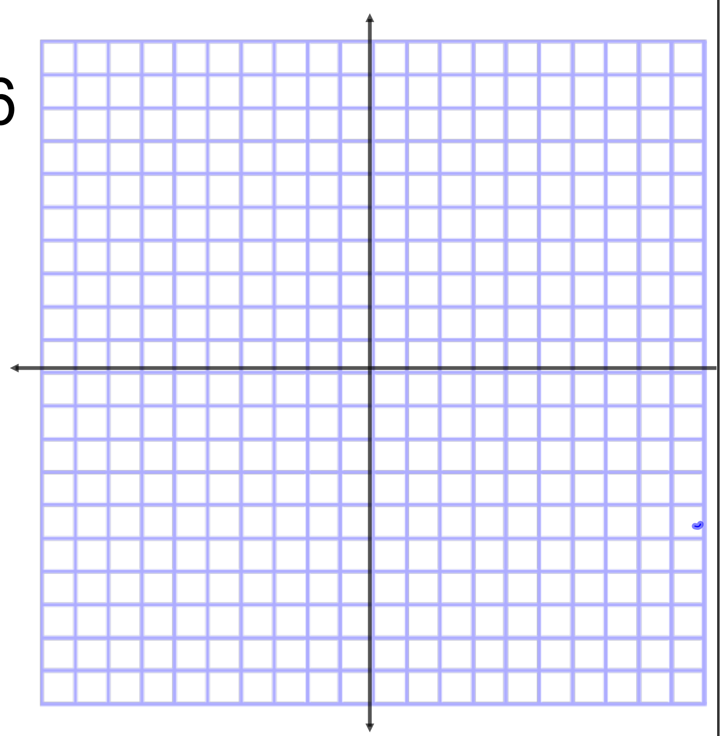
Inequalities

- basic inequalities: solve like an equation using +, -, *, and /
  - if you divide or multiply by a negative number --- the inequality sign flips
- check answer using a value in the solution set
- graphing: ○ open holes with <, >, ≠
  ● closed holes with ≤, ≥, =

Example: solve & graph $-y \ge \frac{y+6}{7}$

Graph the inequality and state the boundary:

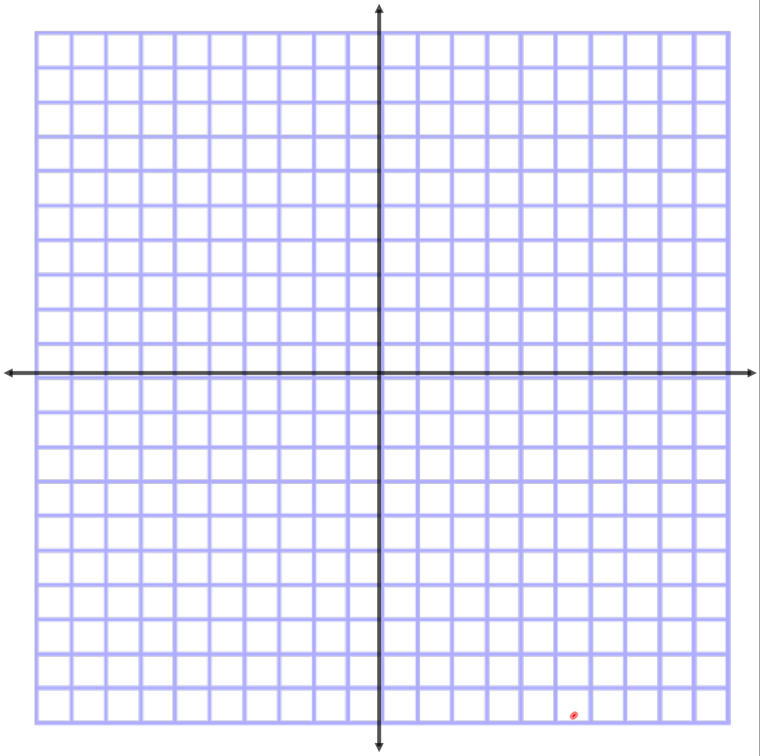
$2x + 3y \ge 6$



Solve the system of inequalities:

$$y \geq 2x + 3$$

$$y < -\frac{1}{2}x - 1$$



Systems of Inequalities #64

Steps:

1. get each inequality in a form to graph (y -intercept form - remember if multi or divide by (-) switch sign)

2. graph each inequality $<, >$ dotted line

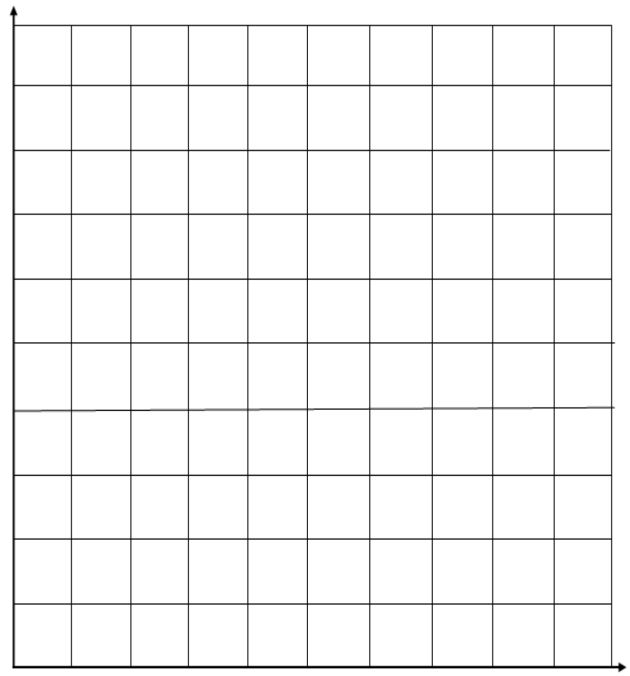
$\leq, \geq$ solid line

3. shade the region defined by each inequality

4. darken the overlapping region (if there isn't one then no solution exists, $\varnothing$)

Solve the system of inequalities:

$$5x+2y\le 20$$
$$2x+3y\le 18$$
$$x+y\ge 2$$
$$x\ge 0$$
$$y\ge 0$$

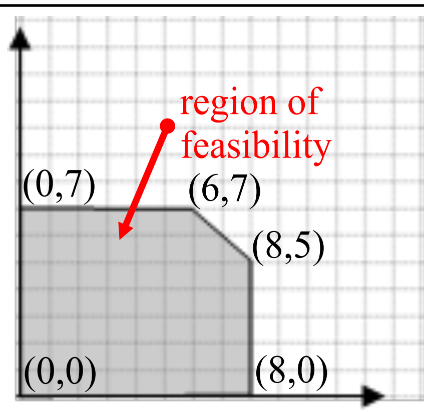


Find the max and min of the objective function:

$$f(x,y)=2x-y$$

1. Find the vertices of the feasible region: (you find these by solving the system using the 2 lines that intersect)

2. Place them in the table.



3. Evaluate using the objective equation

4. The max and min are the largest and smallest number after evaluating

(x , y)	F(x, y) = 2x - y		F(x,y)
(0,0)	2(0)-(0)	=	0
(0,7)	2(0)-(7)	=	-7
(8,0)			

MAX: ____

MIN: ____

Linear Programming #65

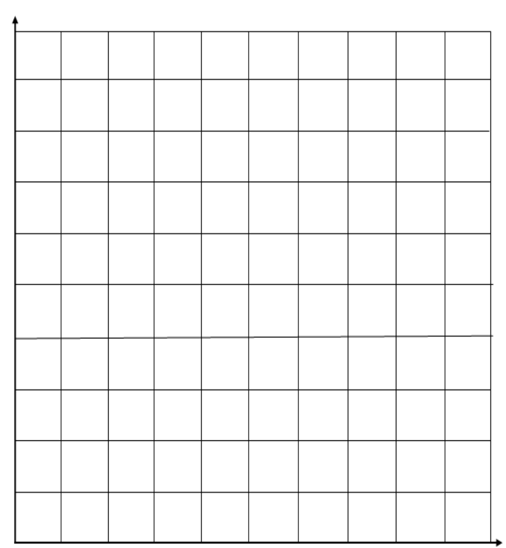
process used to find max or min value of a linear function subject to given conditions called constraints

Steps:

1. Graph the constraints - these are all of the inequalities that create a region of feasibility
2. Find the feasible region - this is the shaded region
3. Find the vertices of the region - these are the corners of the region
4. substitute each vertex (x,y) into the linear function (objective equation) and evaluate
5. Determine the max & min values & where those values occur

Some regions of feasibility are not bounded. If this happens you are not always able to evaluate a max or min value.

Gonza manufacturing has two factories that produces three grades of paper: low, medium and high grade. It needs to supply 24 tons of low grade, 6 tons of medium and 30 tons of high grade paper. Factory A produces 8 tons of low grade, 1 ton of medium grade, 2 tons of high grade daily and costs $2000 per day to operate. Factory B produces 2 tons of low grade, 1 ton of medium grade and 8 tons of high grade paper daily and takes $4000 per day to operate. How many days should each factory operate to fill the orders at minimum cost?



(x,y)	2000x + 4000y	f(x,y)