Factor

$x^2 - 4$

$(x-2)(x+2)$

$n^2 - 16$

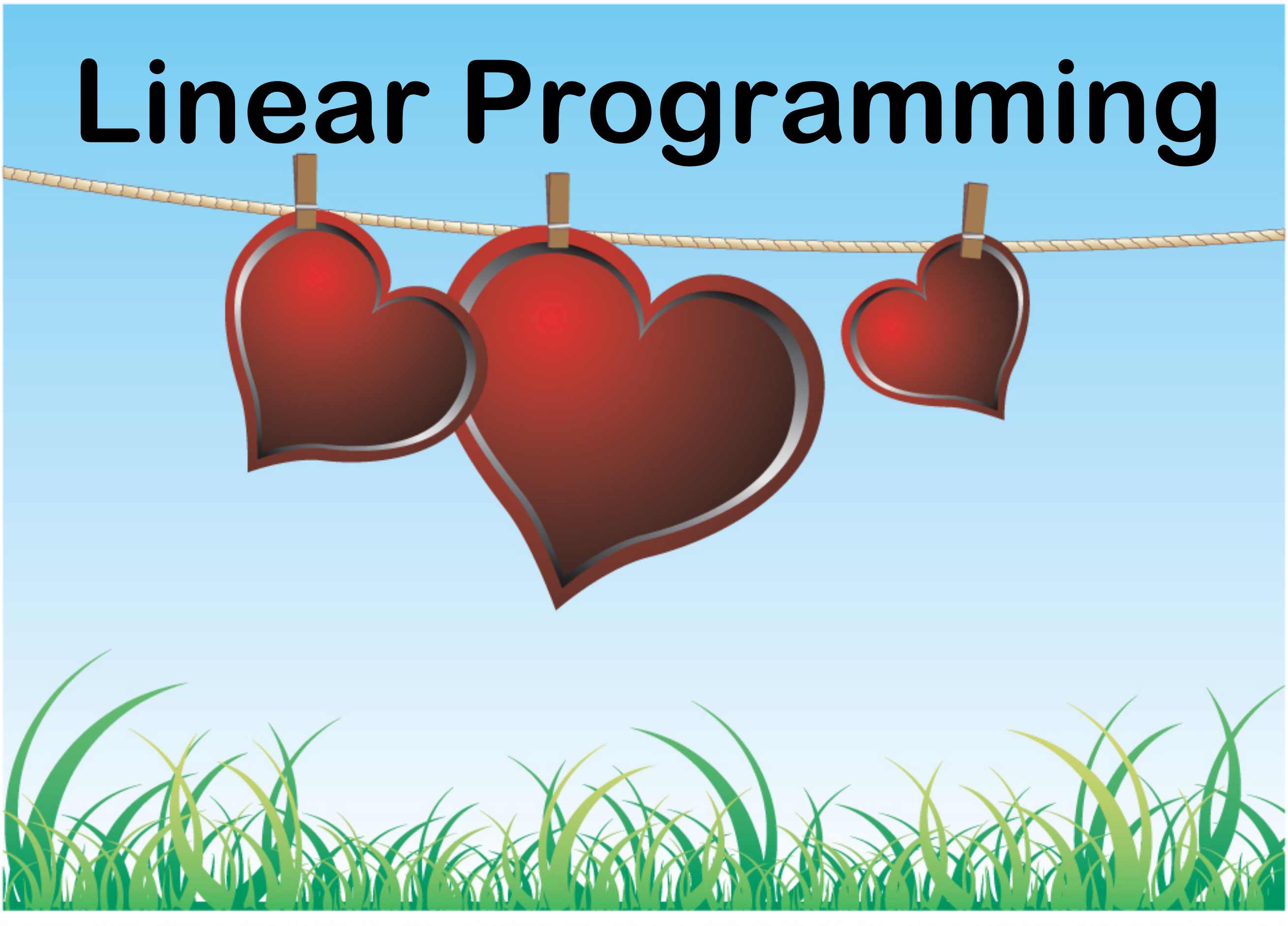
$(n+4)(n-4)$

$25m^2 - 4$

$(5m-2)(5m+2)$

$9n^2 - 16$

$(3n+4)(3n-4)$


Linear Programming

Linear Programming

- Used to find optimal solutions

- Characteristics:

  Constraints (inequalities)

  Feasible region (bound by inequalities)
  (where the shaded areas overlap)

  Function that is to be optimized

Constraints

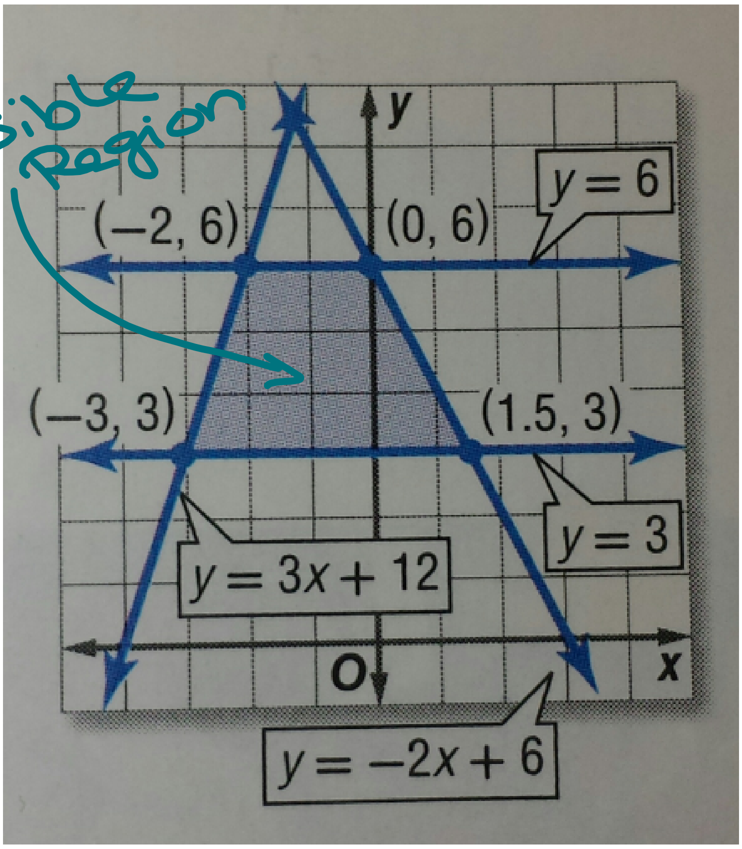
$$3 \le y \le 6$$

$y \ge 3$ $y \le 6$

$$y \le 3x + 12$$

$$y \le -2x + 6$$

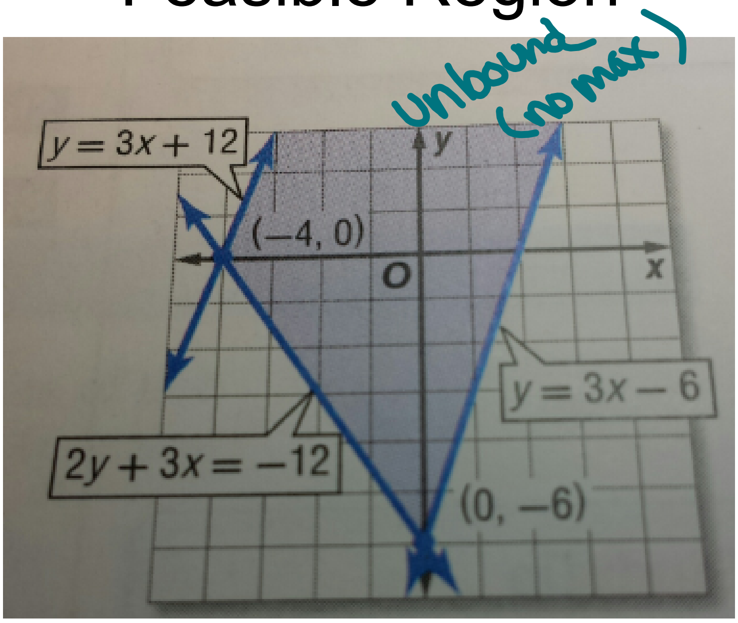
Feasible Region

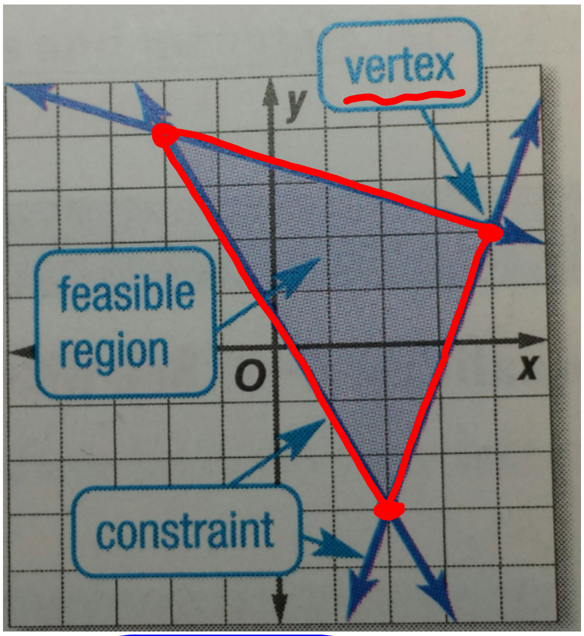


Constraints

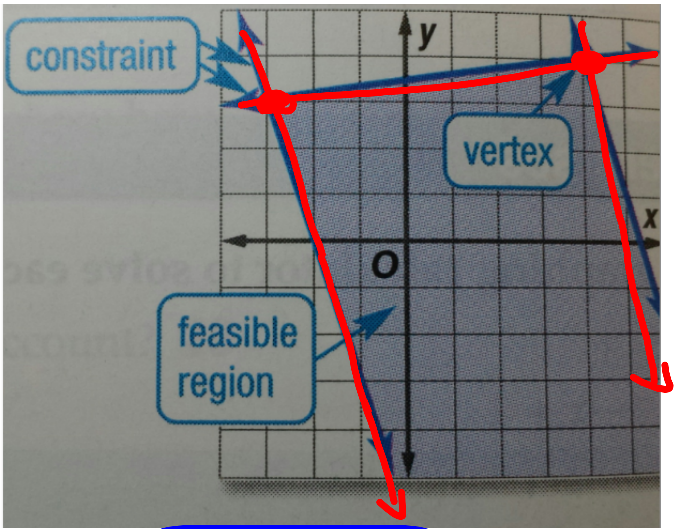
$$2y + 3x \geq -12$$
$$y \leq 3x + 12$$
$$y \geq 3x - 6$$

Feasible Region





Feasible Region

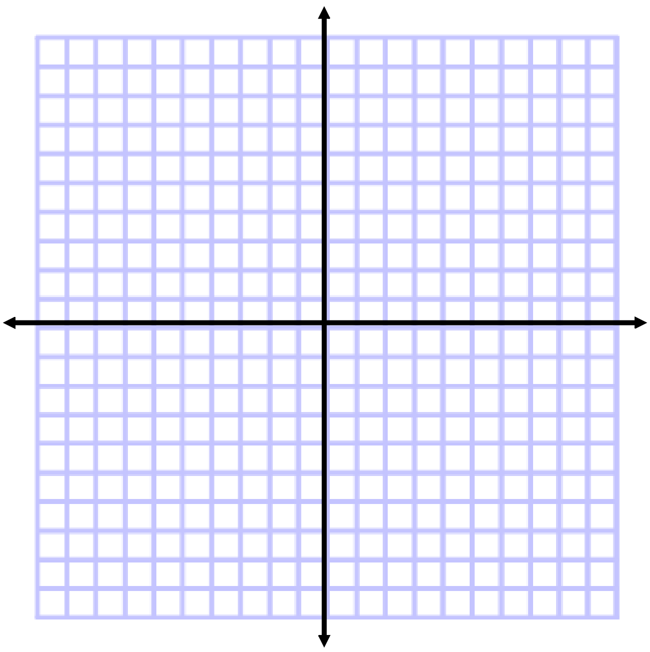


Feasible Region

Constraints

$$1 \leq y \leq 4$$

$$y \geq 0 \qquad x \geq 0$$



Graph the constraints

$\boxed{x \geq 0}$

$\boxed{y \geq 0}$

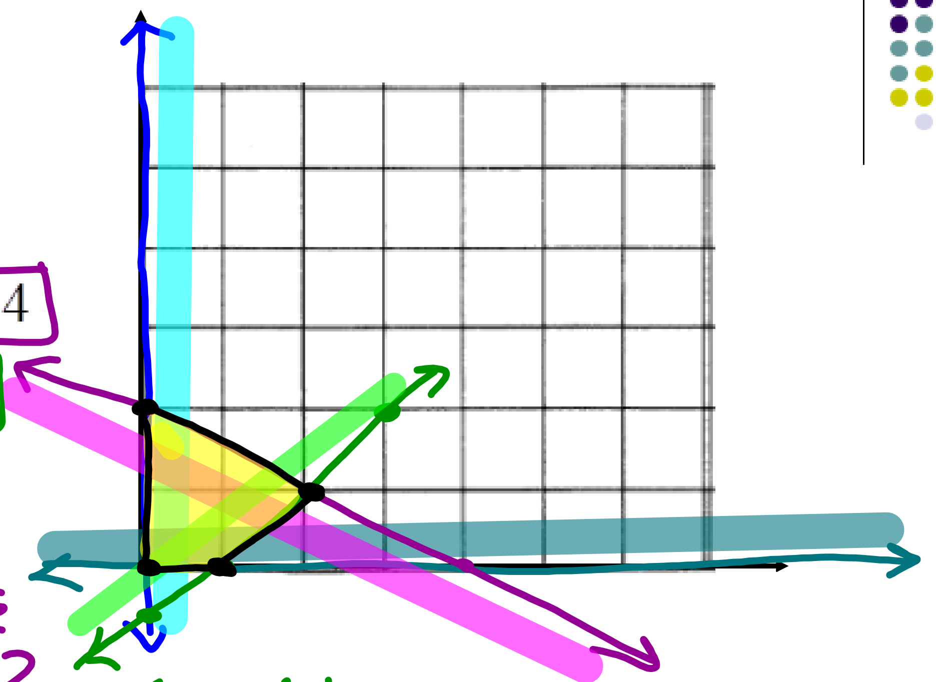
$\boxed{x + 2y \leq 4}$

$\boxed{x - y \leq 1}$

$\cancel{x} + 2y \leq 4$
$-x$

$\frac{\cancel{2}y}{\cancel{2}} \leq \frac{-x}{2} + \frac{4}{2}$

$y \leq -\frac{1}{2}x + 2$



$\cancel{x} - y \leq 1$
$-x$

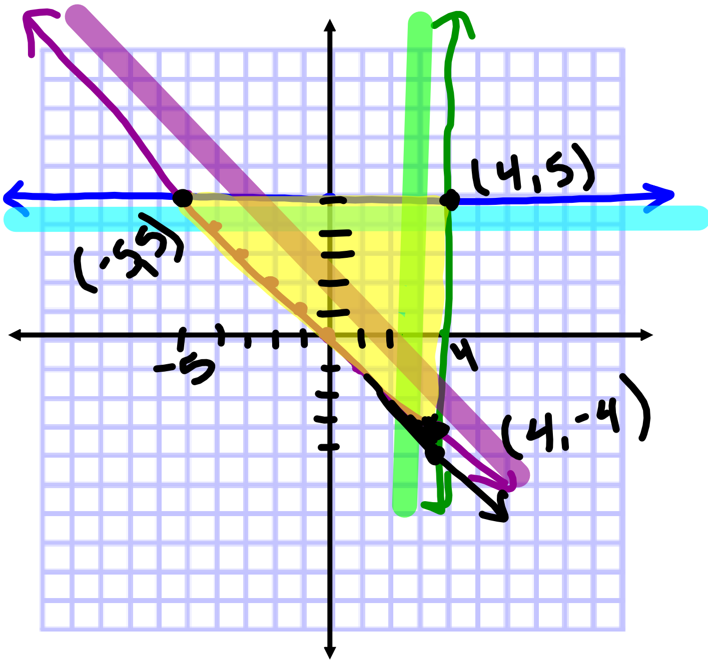
$\frac{\cancel{-}y}{-1} \leq \frac{-x}{-1} + \frac{1}{-1}$

$y \geq x - 1$

Graph each system of inequalities.

Name the vertices and the maximum and minimum values for this function.

$\boxed{y \le 5}$
$\boxed{x \le 4}$
$\boxed{y \ge -x}$



function:

$$f(x,y) = 5x - 2y$$

Vertices: function:

(4, -4)	5x - 2y 5(4) - 2(-4)	28
(-5, 5)	5(-5) - 2(5)	-35
(4, 5)	5(4) - 2(5)	10

Maximum: 28
occurs at (4, -4)

Minimum: -35
occurs at (-5, 5)

Corner-Point Principle

- The maximum & minimum values of the objective function (optimizing) will occur at one of the vertices of the feasible region.

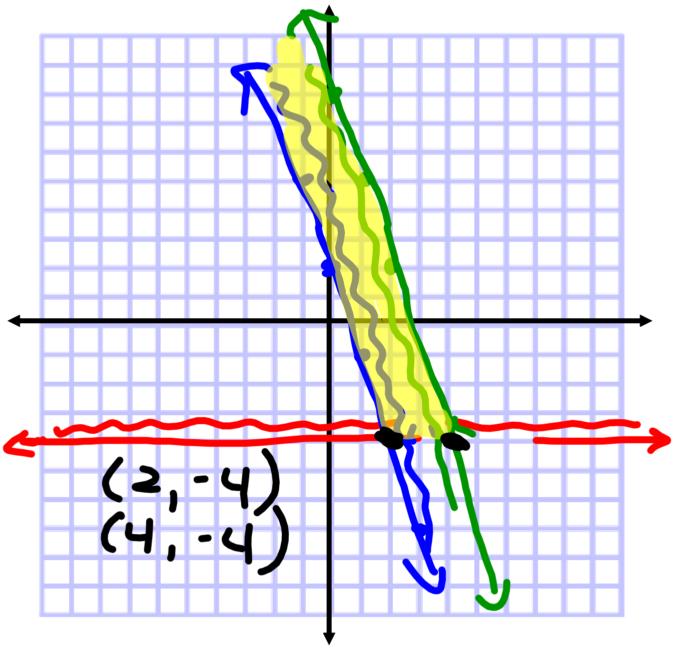
$y \geq -4$

$y \geq -3x + 2$

$9x + 3y \leq 24$ $y \leq -3x+8$

function

$\boxed{f(x,y) = 2x + 14y}$



Vertices	2x + 14y	
(2, -4)	2(2) + 14(-4)	-52 min
(4, -4)	2(4) + 14(-4)	-48