Linear Programming – a procedure for finding the maximum or minimum values of a function subject to given conditions.

- will form a polygon
- max & min values will occur at the vertices

$f(x,y) = 3x + 2y$

$-2 \le x \le 10$ $\quad y \ge -2$

$4x + 5y \le 45$ $\quad y - 2x \le 9$

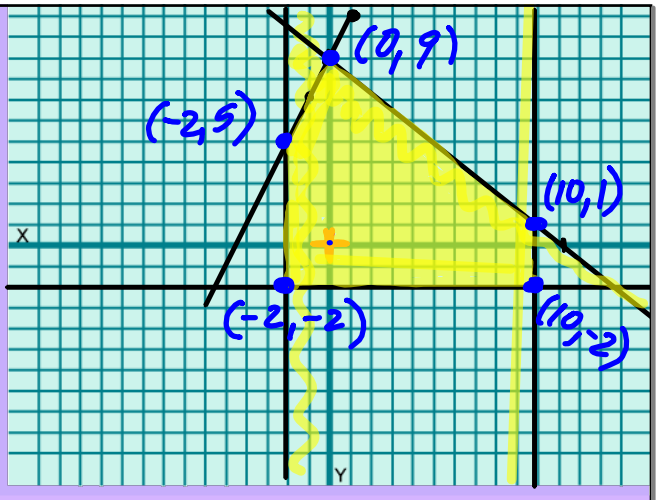
$y \le 2x + 9$

$\frac{45}{4} = 11\frac{1}{4}$	0
0	9

$0 + 0 \le 45$ (T)

Max value of 32 at $(10, 1)$

Min value of -10 at $(-2, -2)$.



$f(x,y) = 3x + 2y$

$f(-2,-2) = 3(-2) + 2(-2) = -10$ *

$f(10,-2) = 3(10) + 2(-2) = 26$

$f(10,1) = 3(10) + 2(1) = 32$ *

$f(0,9) = 3(0) + 2(9) = 18$

$f(-2,5) = 3(-2) + 2(5) = 4$

A nut company has 480 pounds of peanuts and 240 pounds of cashews. To make one batch of the Basic Mix it takes 12 pounds of peanuts and 4 pounds of cashews. To make one batch of the Deluxe Mix it takes 8 pounds of peanuts and 8 pounds of cashews. The profit is $50 per batch of Basic Mix and $35 per batch of Deluxe Mix. How many batches of each mix should be made to maximize profit?

	profit	peanuts	cashews	
x = # of Basic	50	12	4	
y = # of Deluxe	35	8	8	
		480	240	

What is to be maximized or minimized

$f(x,y) = 50x + 35y$

$x \geq 0 \quad y \geq 0$

$12x + 8y \leq 480$

$4x + 8y \leq 240$

$f(0,0) = 0$

$f(0,30) = 1050$

$f(30,15) = 2025$ ← Max

$f(40,0) = 2000$

Make 30 batches of Basic
15 batches of Deluxe

October 3, 2022

Tiny Tot Toys produces toy cars and toy trucks. To produce each car it takes 0.30 hours of assembly, 0.20 hours of inspection, and 0.06 hours for packing. To produce each truck takes 0.50 hours for assembly, 0.08 hours for inspection, and 0.20 hours for packing. Due to equipment requirements, at least 10 cars and 5 trucks must be produced any time production is begun. The firm has available 1800 hours per week for assembly, 800 hours per week for inspection, and 600 hours per week for packing. The firm makes a profit of 50 cents for each car and 75 cents for each truck. How many cars and trucks should the firm produce each week to have maximum profit?

$x \geq 10 \quad y \geq 5$