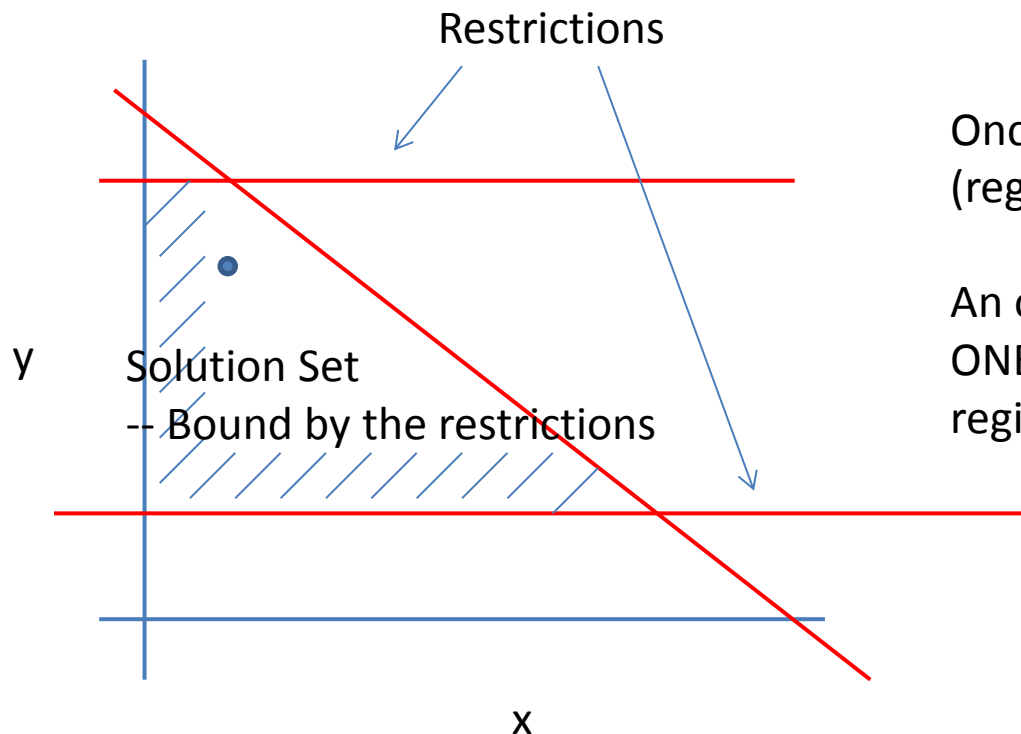


# Optimization

-- Determining **objective functions** is different than restrictions to the system

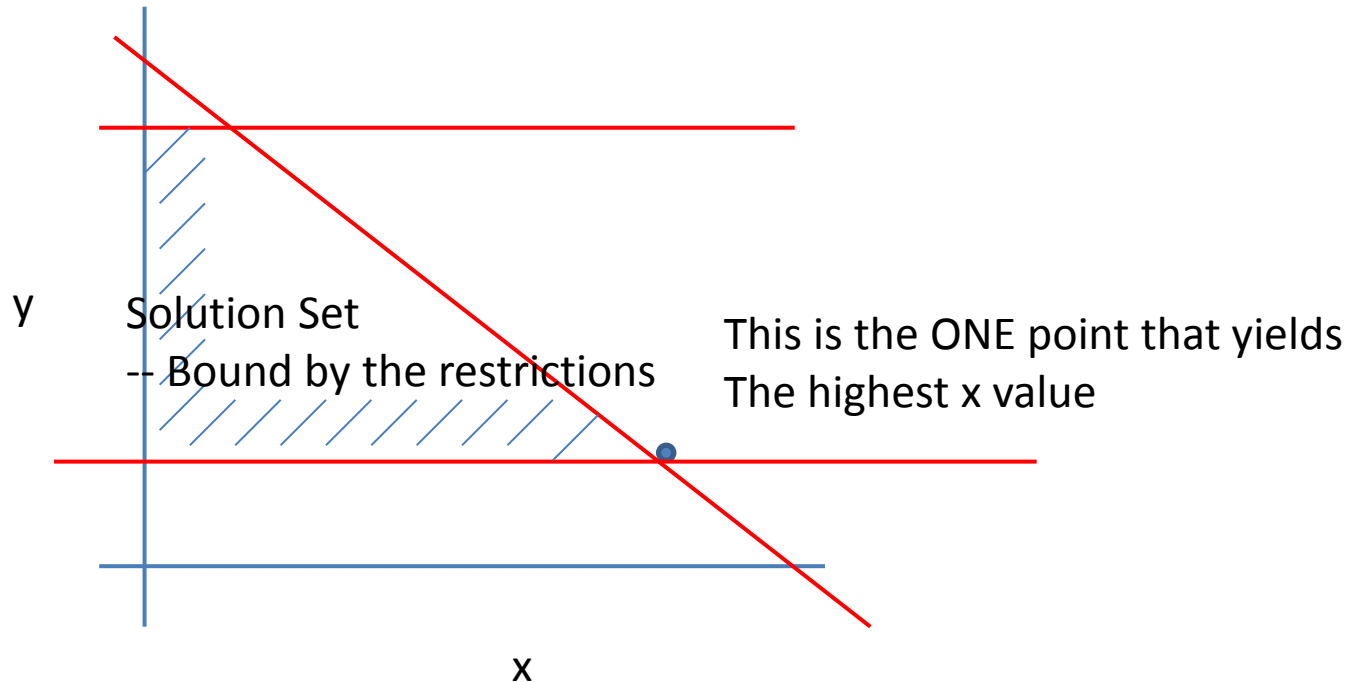


Once we have set the solution set (region of possible answers)

An objective function will give us ONE possible solution within the region that optimizes something

# Optimization

-- Example: Find the solution that **maximizes** the x value



# Example: You are creating a basket of fruit

- Each basket contains at least 5 apples and at least 6 oranges
- Apples cost \$0.20 each / oranges \$0.35 each
- The budget allows no more than \$7.00
- What combination of apples and oranges will result in the maximum number of pieces of fruit  
**(This is the objective / optimization – same thing)**

# Example: You are creating a basket of fruit

-- Each basket contains at least 5 apples  
and at least 6 oranges

**a = number of apples in the basket**

**o = number of oranges in the basket**

-- Apples cost \$0.20 each / oranges \$0.35 each

-- The budget allows no more than \$7.00

-- **What combination of apples and oranges will result in the maximum number of pieces of fruit**

**Objective Function =  $a + o$**

# Example: You are creating a basket of fruit

-- Each basket contains at least 5 apples and at least 6 oranges

$$a \geq 5$$

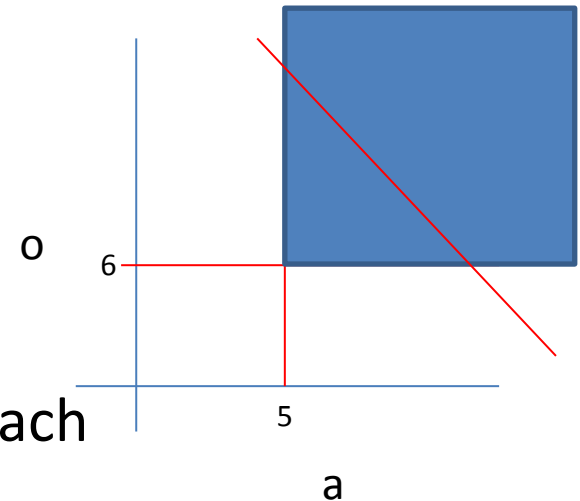
$$o \geq 6$$

-- Apples cost \$0.20 each / oranges \$0.35 each

-- The budget allows no more than \$7.00

$$\text{Basket cost} \leq \text{budget}$$

$$0.20a + 0.35o \leq 7.00$$



NOTE: The OPTIMAL Solution to your objective Will most likely be at a CORNER

TI-83: Intersect

-- What combination of apples and oranges will result in the maximum number of pieces of fruit  
(This is the objective / optimization – same thing)