

Sec 3-4 Linear Programming

A technique that finds the Maximum or Minimum value of a quantity that meets a set of constraints.

↳ inequalities

The **OBJECTIVE FUNCTION** is what you are ultimately trying to either maximize or minimize.

I'm going to the store to buy some CD's and/or some DVD's. DVD's cost \$12 each and CD's cost \$8 each. I can spend no more than \$48 at the store. Suppose I can buy no more than 3 CD's.

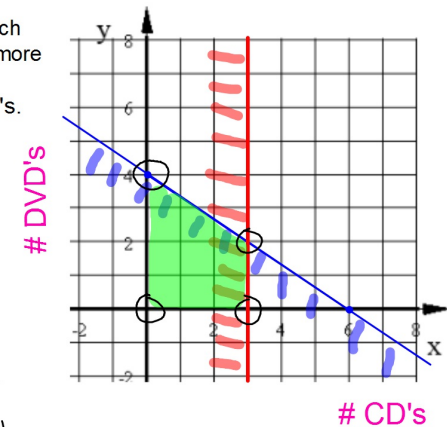
$$C \geq 0 \quad D \geq 0$$

$$8C + 12D \leq 48$$

$$C \leq 3$$

State the corners of the solution region:

$$\begin{matrix} (0,0) & (3,0) \\ (3,2) & (0,4) \end{matrix}$$



Using the CD and DVD example. Suppose I'm trying to maximize the amount of media I can get for my money.

Suppose CD's hold 300 minutes of music and DVD's hold 250 minutes of video. Find the combination of CD's and DVD's that maximize the amount of media yet meet all the constraints set forth already.

Objective Function: $y = 300C + 250D$

$$\begin{aligned} C &= \# \text{CD's} \\ D &= \# \text{DVD's} \end{aligned}$$

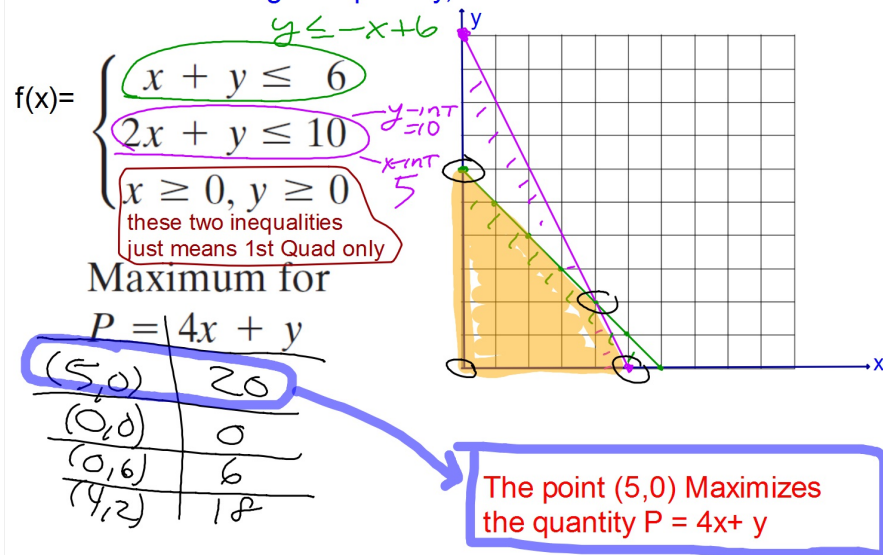
The Corner-Point Principle:

Any maximum or minimum value of a linear combination of variables will occur at one of the vertices of the feasible region (shaded region).

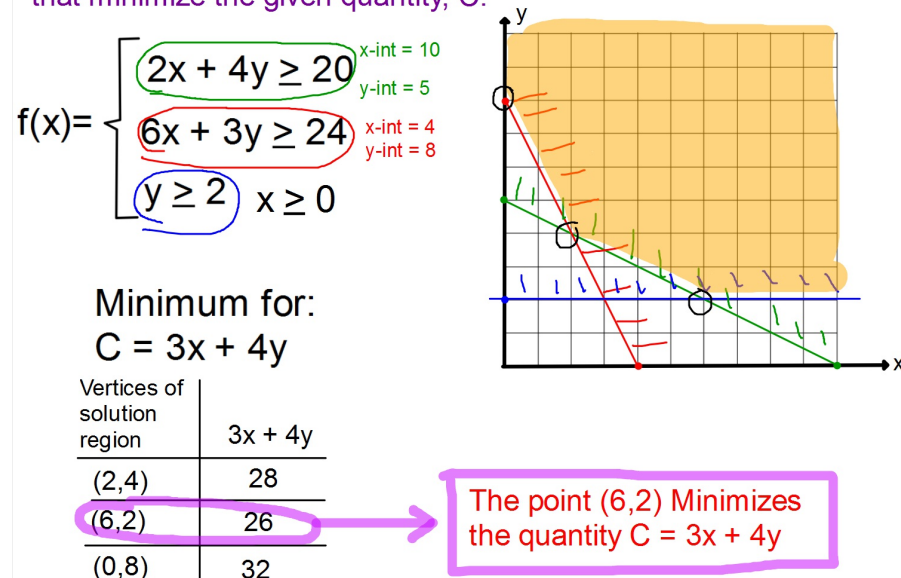
Vertices of the feasible region	Objective Function $300C + 250D$
(0,0)	$300(0) + 250(0) = 0$
(3,0)	$300(3) + 250(0) = 900$
(3,2)	$300(3) + 250(2) = 1400$
(0,4)	$300(0) + 250(4) = 1000$

If you buy 3 CD's and 2 DVD's you'll Maximize the amount of media you can purchase and meet all the constraints in the problem.

Graph this system of inequalities and find the values of x and y that maximize the given quantity, P .



Graph this system of inequalities and find the values of x and y that minimize the given quantity, C .



You can now finish Hwk #18

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Problems 2, 3, 6, 8, 9, 18

Use graph paper for these!