Pre-Calculus II

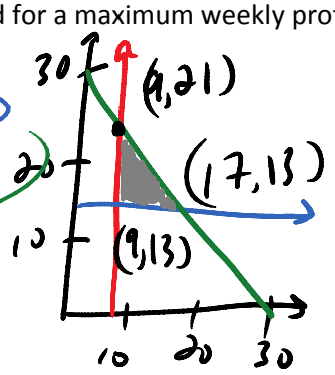
Linear Programming Worksheet #2

Directions: Include **objective statement**, **all inequalities**, an **accurate graph**, **all corner points** and their **substitution** into the objective statement, and the **final answer** written with words.

1. A carpentry shop makes dinner tables and coffee tables. Each week the shop must complete at least 9 dinner tables and 13 coffee tables to be shipped to furniture stores. The shop can produce at most 30 dinner tables and coffee tables combined each week. If the shop makes a profit of $120 for dinner tables and $150 for coffee tables, how many of each item should be produced for a maximum weekly profit? What is the maximum weekly profit?

$P = 120x + 150y$
x = DINNER
y = COFFEE

$x \geq 9$
$y \geq 13$
$x + y \leq 30$



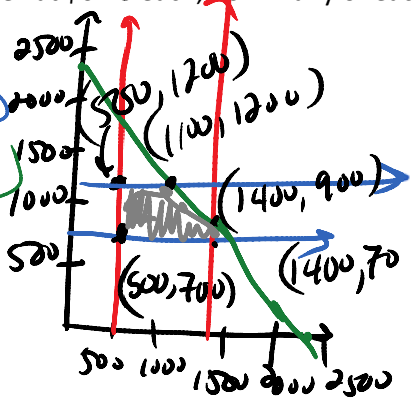
x	y	P
9	21	4230
17	13	3990
9	13	3030

9 DINNER 21 COFFEE $4230

2. Mrs. Smith grows peaches and apples. At least 500 peaches and 700 apples must be picked daily to meet minimum demands from the buyers. The workers can pick no more than 1200 apples and 1400 peaches daily. The combined number of peaches and apples that the packaging department can handle is 2300 per day. If Mrs. Smith sells her apples at $0.25 each and peaches sell at $0.20 each, how many of each should be picked daily for maximum income?

$P = 0.25x + 0.2y$
x = APPLES
y = PEACHES

$500 \leq x \leq 1400$
$700 \leq y \leq 1200$
$x + y \leq 2300$



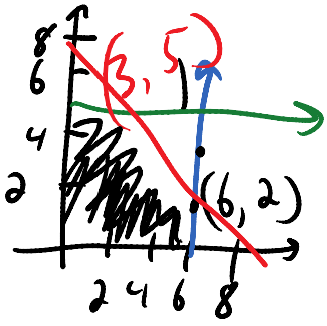
x	y	P
500	1200	365
1100	1200	515
1400	900	530
1400	700	490
500	700	265

1400 PEACHES + 900 APP $530

3. A machine can produce either nuts or bolts, but not both at the same time. The machine can be used at most 8 hours a day. Furthermore, at most 6 hours can be used for making nuts and at most 5 hours can be used for making bolts. There is a $2 profit for each hour the machine makes nuts and a $3 profit for each hour the machine makes bolts. How many hours per day should the machine make each item in order to maximize the profit? What is the maximum profit?

$P = 2x + 3y$
x = NUTS
y = BOLTS

$x + y \leq 8$
$x \leq 6$
$y \leq 5$



x	y	P
3	5	21
0	3	9
6	2	18
0	0	0
6	0	12

6 NUTS + 5 BOLTS FOR $27

4. Mr. Beauregard raises only pigs and goats, and this year he intends to raise 16 animals. There is plenty of room in the pigpen, but a lack of space limits the number of goats to 12. One other limitation is money: it costs $5 per day to raise a pig and $2 per day to raise a goat, and he can spend only $50 per day on the animals. If Mr. Beauregard can make a profit of $17.50 per goat and $14.00 per pig, how many of each should he raise to maximize his profit? What is his maximum profit?

$P = 17.5x + 14y$

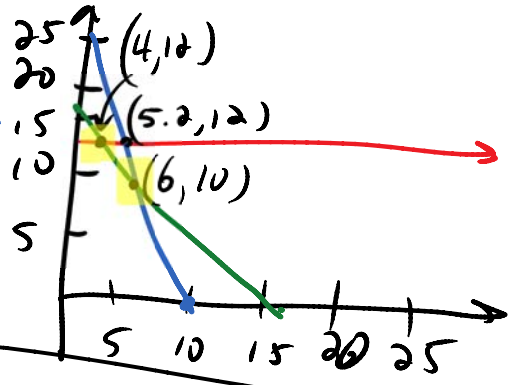
x = PIGS

y = GOATS

$y \le 12$

$5x + 2y \le 50$

$x + y = 16$



x	y	P
4	12	238
6	10	245
~~5~~	~~12~~	~~259~~

6 PIGS 10 GOATS → $245

5. A theater contains 500 seats. For an upcoming talent show, the theater manager plans to sell $4 and $5 tickets. He must sell at least 200 $4 tickets and 100 $5 tickets for the show to be produced, and he must bring in at least $2000 to break even. How many tickets at each price should be sold to maximize income? What is the maximum income?

I $P = 4x + 5y$

x = $4 TICK.

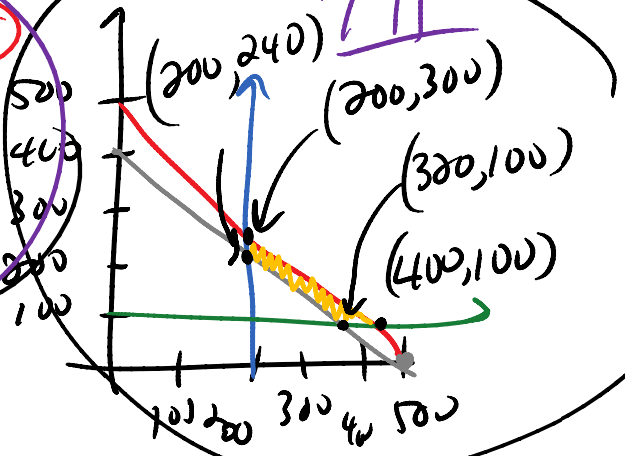
y = $5 TICK

II $x + y \le 500$

$x \ge 200$

$y \ge 100$

$4x + 5y \ge 2000$



III

IV

x	y	P
200	240	2000
200	300	2300
375	100	2000
400	100	2100

200 $4 AND 300 $5 FOR $2300

V