1.3 Re-Teach Worksheet

Name ___Key___

Intermediate Algebra

1. A lumber company converts logs into baseball bats. In a week, the company can turn out 400
   bats, of which 100 deluxe bats and 150 regular bats are required on a regular basis. The profit of
   a deluxe baseball bat is $20 and the profit on a regular baseball bat is $30. How many of each
   type should the lumber company make to have maximum profit?

a) Define the variables:

X - deluxe bats

Y - Regular bats

b) Constraints Given:

$X \geq 100$

$Y \geq 150$

$x + y \leq 400$

c) Objective Function (profit):

$20X + 30Y = P$

d) List the Vertices:

$(100, 150) \rightarrow 20(100) + 30(150)$
$2,000 + 4,500 = 6,508$

$(250, 150) \rightarrow 20(250) + 30(150) =$
$= 5,000 + 4,500 = 9,500$

$(100, 300)$
$20(100) + 30(300) = 2,000 + 9000 = 11,600$

e) What is the maximum profit?

$11,000$
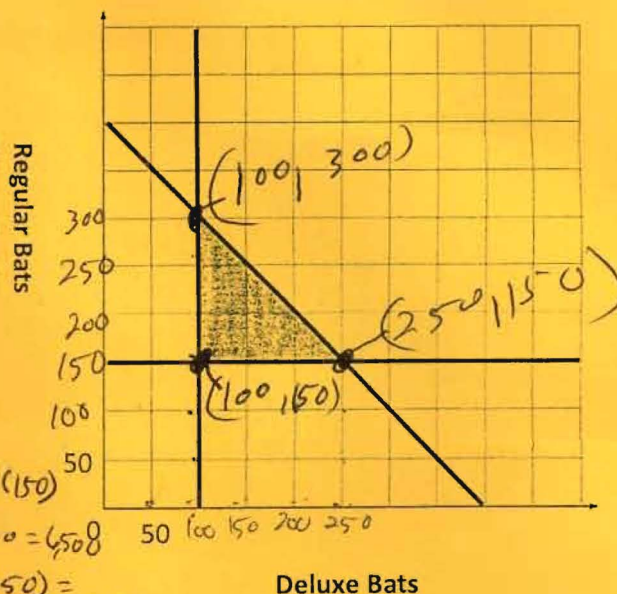
f) Number of deluxe bats for max profit:

100

g) Number of regular bats for max profit:

300

Graph labels: Regular Bats (vertical axis), Deluxe Bats (horizontal axis)

Vertical axis values: 300, 250, 200, 150, 100, 50

Horizontal axis values: 50, 100, 150, 200, 250

Points marked: $(100, 300)$, $(250, 150)$, $(100, 150)$

2. A window manufacturing company makes two types of windows, regular and heavy duty. Each regular window takes approximately 3 hours to cut and 2 hour to finish. The heavy-duty windows take 2 hours to cut and 4 hours to finish. There are 48 hours available for cutting and 72 hours available for finishing. Each regular window makes a net profit of $80 and the heavy-duty window makes a net profit of $200. How many of each window should be made for the company to make a maximum profit?

a) Define the variables:

$X =$ Reg windows

$Y =$ heavy duty

b) Objective function:

$$80x + 200y = P$$
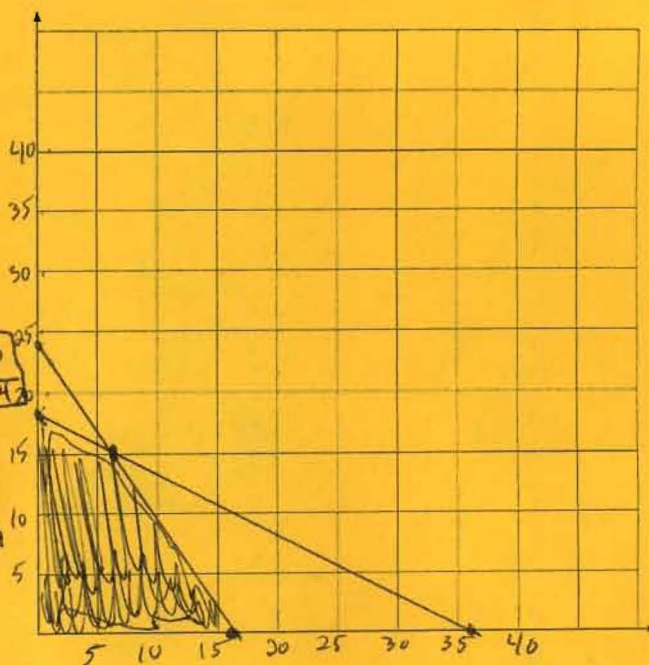
c) Constraints:

hours to cut:

$$3x + 2y \leq 48$$

X	16	0
Y	0	24

hours to finish:

$$2x + 4y \leq 72$$

X	0	36
Y	18	0

d) Graph the constraints and shade.

e) List the vertices and find the profit for each:

$(0,0) \rightarrow 80(0) + 200(0) = 0$

$(16,0) \rightarrow 80(16) + 200(0) = 1280$

$(0,18) \rightarrow 80(0) + 200(18) = 3600$

$(6,15) \rightarrow 80(6) + 200(15) = 3480$

f) Make a recommendation. (How many of each type should be planted and what is the max profit?)

0 Reg windows and 18 heavy duty windows

for $3600 profit.