

QUIZ 9

PRINT NAME _____

SIGN NAME _____

SET UP FOR PROBLEMS 1 AND 2: The Old Town Canoe Company produces two types of canoes, the Columbian and the Katahdin. The production of one Columbian canoe requires 200 hours of labor and 180 square feet of fiberglass cloth. The production of one Katahdin canoe requires 250 hours of labor and 240 square feet of fiberglass cloth. For their next production run, the company has available 40,000 hours of labor and 35,000 square feet of fiberglass cloth. The profit made on each Columbian canoe is \$200. The profit made on each Katahdin canoe is \$150. Use the following variables to answer the questions below:

w = # number of hours of labor used in production

x = # of number of Columbian canoes produced

y = # number of Katahdin canoes produced

z = # number of square feet of fiberglass cloth used in production.

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- 1) (10 PTS.) What is the objective function in this set-up (i.e. find the function representing net profit)?

OBJECTIVE FUNCTION: $200x + 150y$

- 2) (15 PTS.) For the linear programming problem corresponding to this set-up, list below the constraint equations. There may be more blank lines than constraint equations.

$x \geq 0$

$y \geq 0$

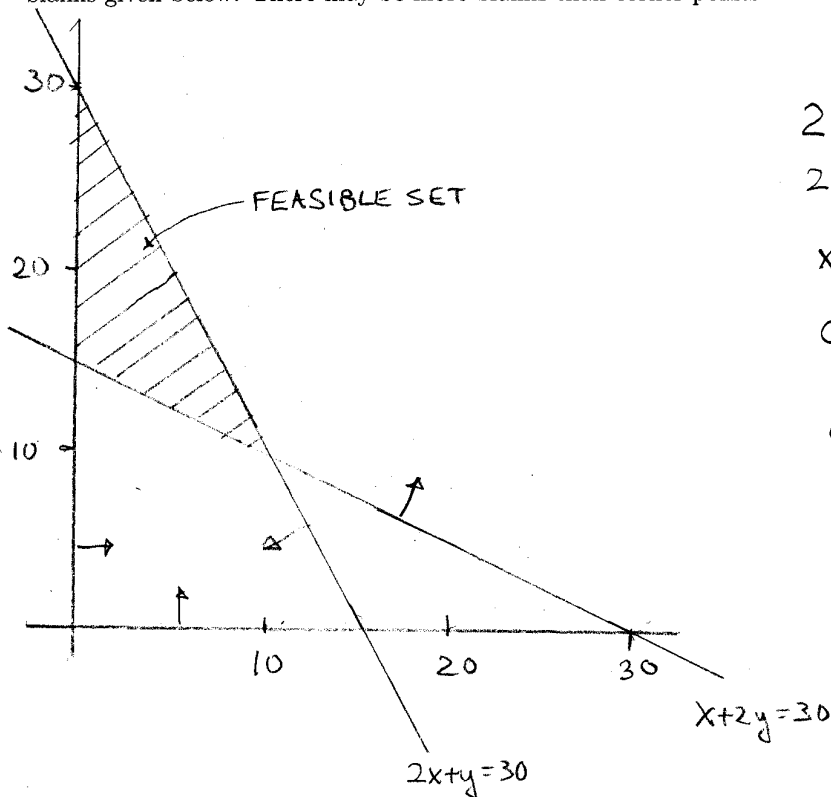
$200x + 250y \leq 40,000$

$180x + 240y \leq 35,000$

3) (15 PTS.) Consider the feasible set described by the following inequalities

$$\begin{aligned} 2x + y &\leq 30 \\ x + 2y &\geq 30 \\ x &\geq 0 \\ y &\geq 0 \end{aligned}$$

Sketch this feasible set on the chart given below. Label each corner point and list its coordinates in the blanks given below. There may be more blanks than corner points.



$$\begin{aligned} 2x + y = 30 &\Rightarrow (0,30) (15,0) \\ 2 \cdot 0 + 0 &\leq 30 \Rightarrow (0,0) \in \text{FEASIBLE} \end{aligned}$$

$$x + 2y = 30 \Rightarrow (0,15) (30,0)$$

$$0 + 2 \cdot 0 \geq 0? \text{ NO } (0,0) \notin \text{FEAS.}$$

CORNER POINTS:

$$(0,15) (0,30)$$

$$\begin{aligned} 2x + y &= 30 \\ x + 2y &= 30 \quad \times 2 \\ \hline 2x + y &= 30 \\ 2x + 4y &= 60 \\ \hline -3y &= -30 \\ y &= 10 \Rightarrow x = 10 \end{aligned}$$

Corner points: Location = (0,15) (0,30) (10,10)

↑
ALSO OBVIOUS BY SYMMETRY

4) (10 PTS.) Find the maximum of the function $3x + 2y$ on the feasible set of problem 3.

	$3x + 2y$
(0,15)	30
(0,30)	60
(10,10)	50

Answer: Maximum Value = 60

Answer: Location = (0,30)