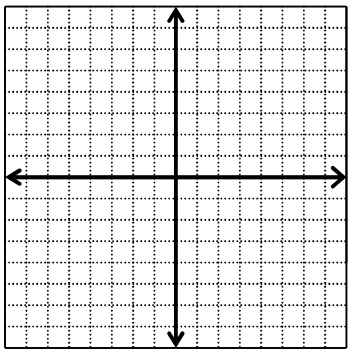
M1324 Exam 2 (5.1 – 5.3) (40 points) Name: _____

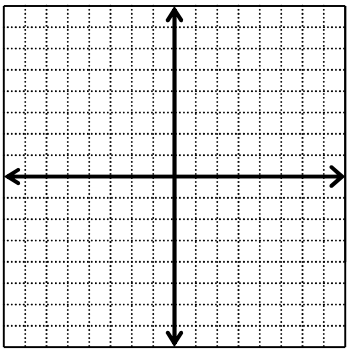
Graphing Calculator is allowed. Show work for credit. Professor: McDaniel

Graph the following inequalities. Only shade the solution and graph exact points. (2 pts each)

1.) $-2x - 2y < 4$

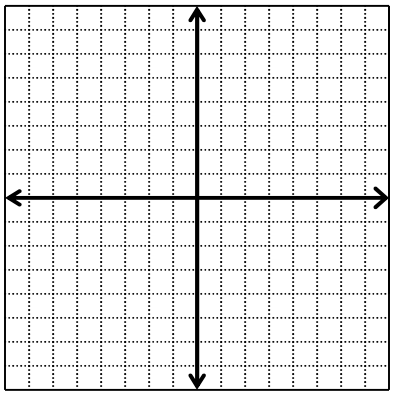


2.) $-3x \leq -2y$



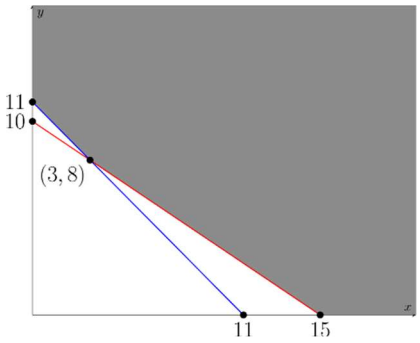
Graph the following system of inequalities. Only shade the solution and graph exact points. Do not rescale. (6 pts)

3.) $2x - y < 4$
$3y + x < 3$
$x \geq -3$



Find the coordinates that maximize and minimize the following. If not possible, write "none". (4 pts)

4.) Maximize and minimize
$z = 40x + 50y$
Subject to:
$2x + 3y \geq 30$
$x + y \geq 11$
$x, y \geq 0$



Coordinates that maximize = _____ Coordinates that minimize = _____

Solve the system graphically and find the coordinates that minimize and maximize. Graph exact points. (6 points)

5.) Minimize and maximize

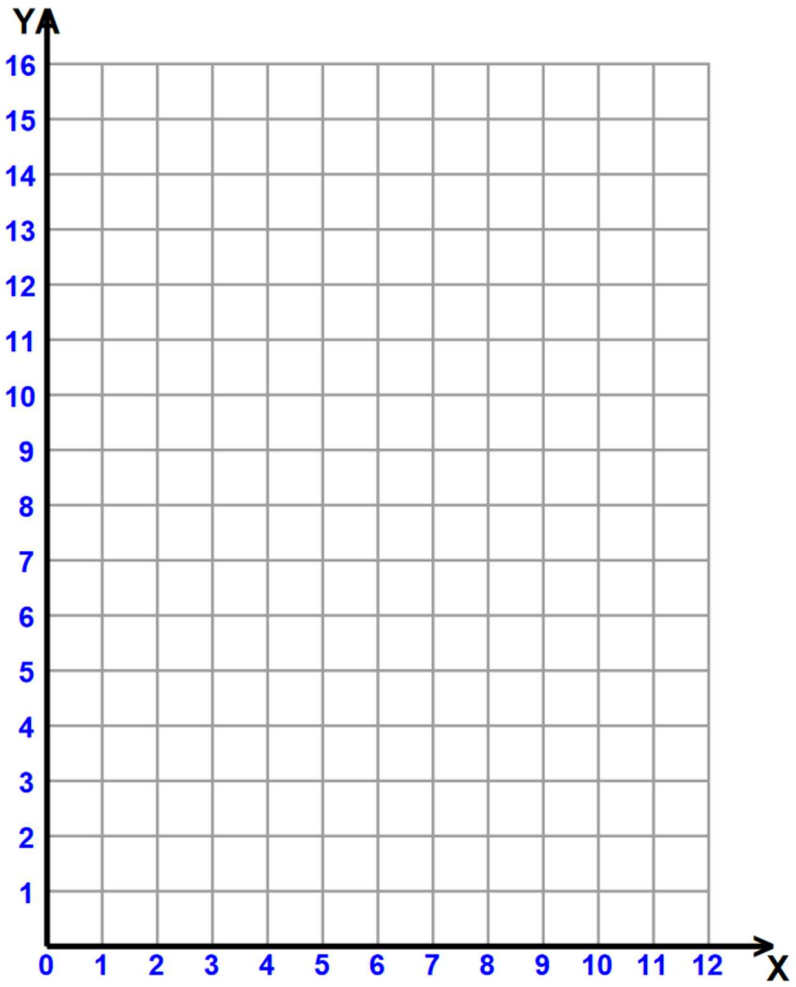
$P = 30x + 10y$

Subject to $2x + 2y \geq 4$

$6x + 4y \leq 36$

$2x + y \leq 10$

$x, y \geq 0$



Corner Points:

Point that minimizes: _____ **Minimum value: _____**

Point that maximizes: _____ **Maximum value: _____**

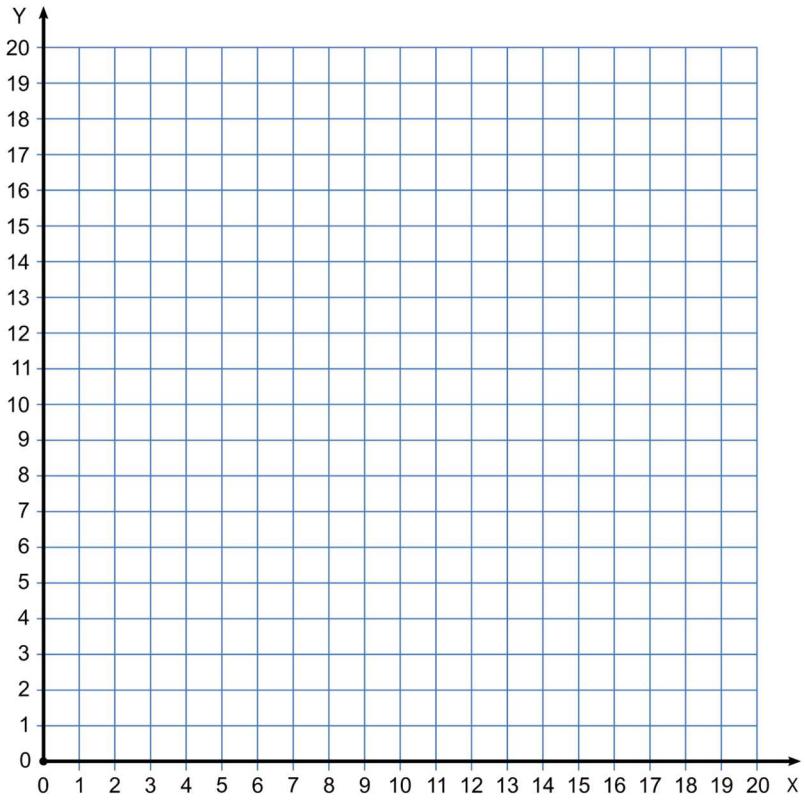
6.) A furniture manufacturing company manufactures dining-room tables and chairs. The relevant manufacturing data are given on the table below. How many tables and chairs should be manufactured each day to achieve a maximum profit? What is the maximum profit? Write the constraints, graph them and shade the feasible region. Be exact on the graph. (10 points)

Department	Labor-Hours per Unit (Table)	Labor-Hours per Unit (Chair)	Maximum Labor-Hours Available per Day
Assembly	8	2	400
Finishing	2	1	120
Profit per Unit	$90	$25	

a.) Give all Constraints. You may "purchase" the constraints for -3 pts.

$x \geq 0, y \geq 0$

b.) Graph (be exact)



(Scale by 10)

c.) Corner Points:

d.) Objective Function: _____

Point that maximizes: _____ **Maximum value: _____**

e.) How many tables and chairs should be manufactured each day to achieve a maximum profit? Answer in a complete sentence.

7.) A farmer needs to meet monthly minimum requirements for phosphoric acid, nitrogen, and potash using two types of plant food, Mix A and Mix B. Each cubic yard of Mix A contains 20 pounds of phosphoric acid, 30 pounds of nitrogen, and 5 pounds of potash, while each cubic yard of Mix B contains 10 pounds of phosphoric acid, 30 pounds of nitrogen, and 10 pounds of potash. The farmer must obtain at least 460 pounds of phosphoric acid, 960 pounds of nitrogen, and 220 pounds of potash each month. Mix A costs $30 per cubic yard and Mix B costs $35 per cubic yard. How many cubic yards of each mix should the farmer purchase to minimize total cost, and what is that cost? (10 points)

Chart: (Optional) **Sketch Graph**

a.) Give all Constraints. You may "purchase" the constraints for -3 pts.

$x \geq 0, y \geq 0$

b.) Corner Points:

c.) Objective Function: _____

Point that minimizes: _____ **Minimum value: _____**

d.) How much of each food mix should they purchase to minimize the cost? Answer in a complete sentence.