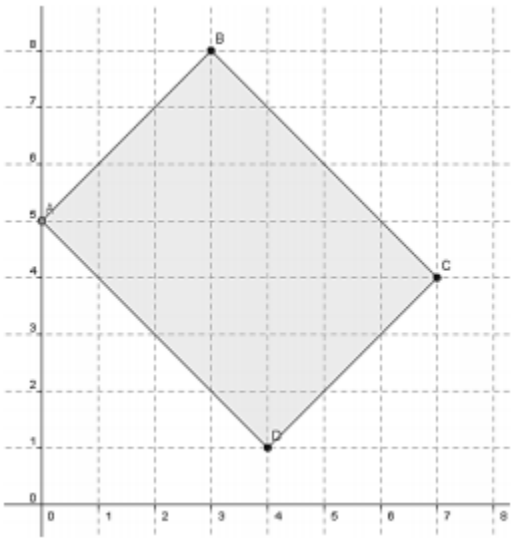
Name: _____ Date: _____

Algebra 1 – Linear Programming Practice

1. Use the graph below to determine the minimum and maximum values of the given function.



$\boldsymbol{f(x,y) = 3x + 2y}$

2. Graph the following constraints and determine the minimum and maximum values of the given function.

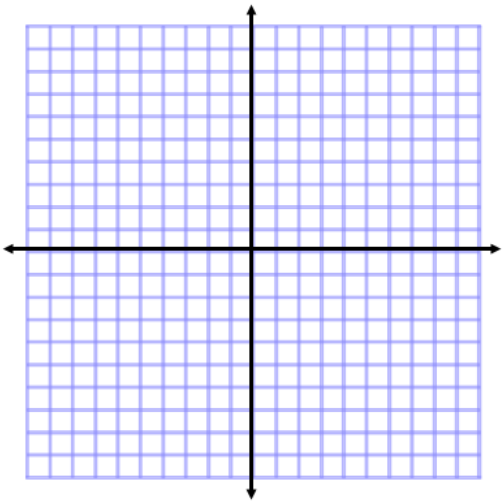
Constraints:

$y \leq -\frac{2}{3}x + 4$

$y \geq x - 6$

$x \geq 0$

Function: $f(x,y) = 6x - y$



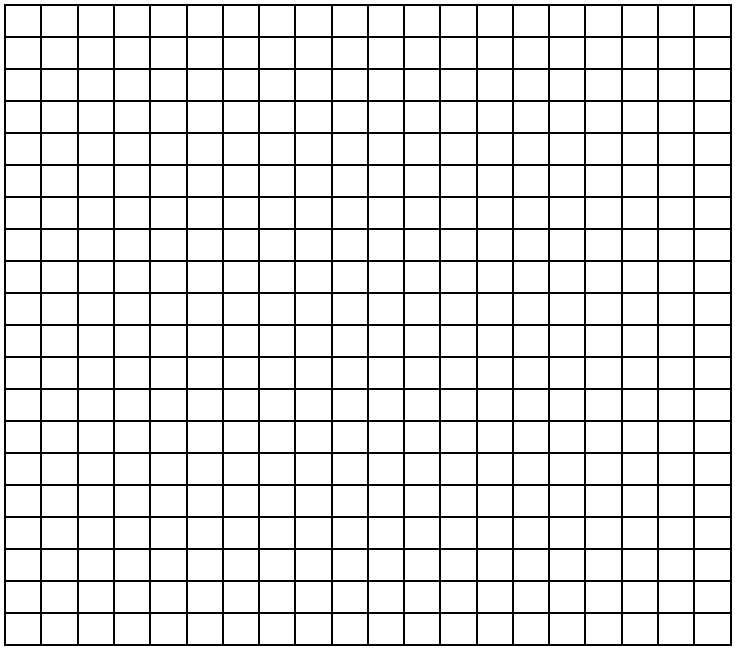
3. A toy company makes trucks and dolls. The company needs to make at least 20 cases of trucks to fulfill the orders already placed for Christmas. They also need to make at least 30 cases of dolls. All together the toy company cannot produce more than 80 cases of toys because of labor and material limits. The company makes $200 profit off a case of trucks and $180 profit off a case of dolls. Which combination of cases of trucks and cases of dolls will give the company the most profit?

a. Define variables:

b. Write a function:

c. Write the constraints:

d. Graph the constraints:



e. Fill in the table and determine which combination of trucks and dolls maximizes the profit.

Vertices	Function:	Profit

Solution Sentence:

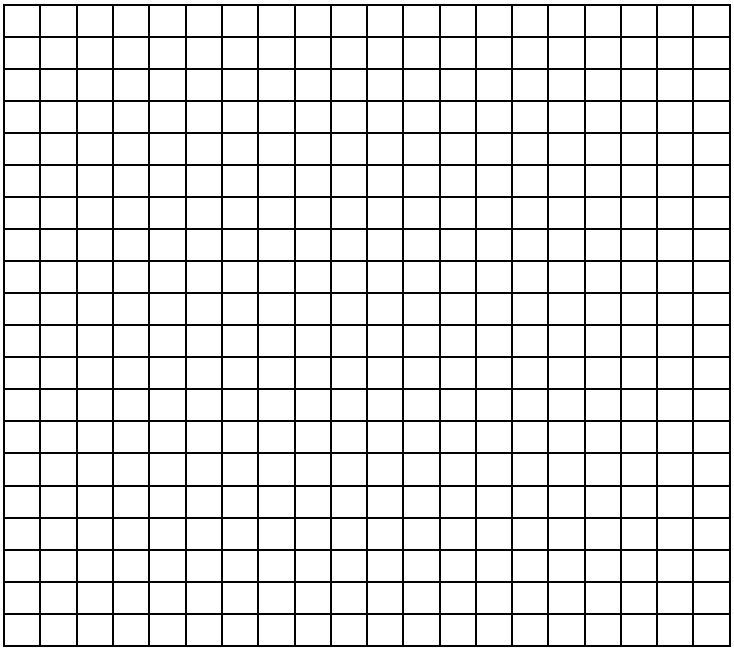
4. Aubrey makes two types of jewelry; necklaces and earrings. She is trying to maximize her profit from selling her jewelry. She has a limited number of boxes to package her jewelry, so at most she can make 12 pairs of earrings and 20 necklaces. Additionally, she needs 8 beads for each pair of earrings and 6 beads for each necklace, but only has 144 beads in total. Aubrey profits $21 for each pair of earrings and $15 for each necklace. How many pairs of earrings and necklaces can Aubrey make and sell to maximize her profit?

a. Define variables:

b. Write a function:

c. Write the constraints:

d. Graph the constraints:



f. Fill in the table and determine which combination of earrings and necklaces maximizes the profit.

Vertices	Function:	Profit

Solution Sentence:

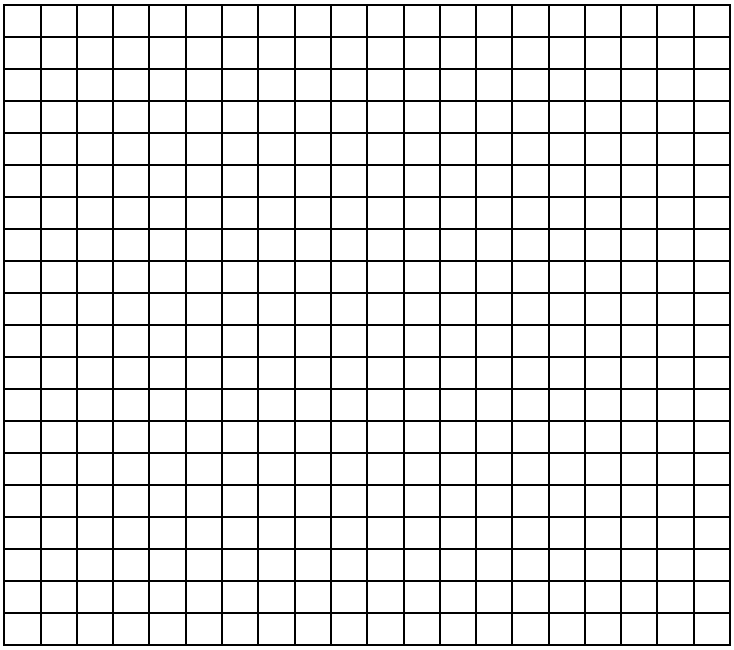
5. Bob builds tool sheds. He uses 10 sheets of dry wall and 15 studs for a shed and 15 sheets of dry wall and 45 studs for a large shed. He has available 60 sheets of dry wall and 135 studs. If Bob makes $390 profit on a small shed and $520 on a large shed, how many of each type of shed should Bob build to maximize his profit?

a. Define variables:

b. Write a function:

c. Write the constraints:

d. Graph the constraints:



e. Fill in the table and determine which combination of small and large sheds maximizes the profit.

Vertices	Function:	Profit

Solution Sentence:

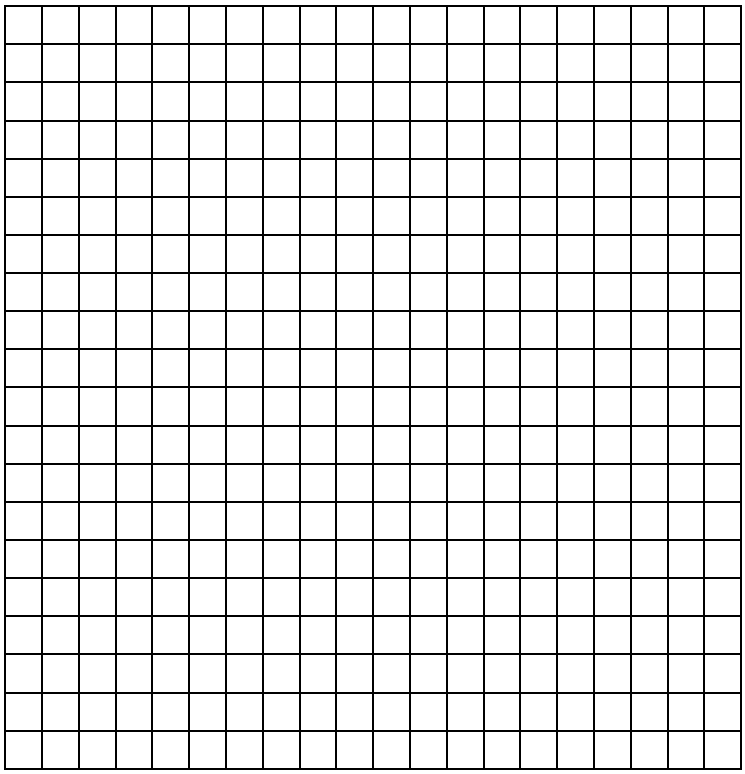
6. A farmer has 600 acres of land to grow corn or soybeans. Because of a government subsidy he has to grow corn and he needs to grow at least 250 acres of soybeans. The farmer makes a profit of $80 for each acre of corn and $75 for each acre of soybeans. Find the number of acres of corn and soybeans the farmer should plant to earn the maximum profit.

a. Define variables:

b. Write a function:

c. Write the constraints:

d. Graph the constraints:



e. Fill in the table and determine which combination of corn and soybeans maximizes the profit.

Vertices	Function:	Profit

Solution Sentence: