Name: Date:

**Linear Programming**

A manufacturer wants to optimize the profit for two products. Product I yields a profit of $1.50 per unit, and product II yields a profit of $2.00 per unit. Market tests and available resources have indicated the following constraints:

* The combined production level should not exceed 1,200 units per month.
* The demand for product II is no more than half the demand for product I.
* The production level of product I is less than or equal to 600 units plus three times the production level of product II

Find the level that maximizes the profit with the given restraints.

Let’s take a few steps back!!!!

Let’s define a few important terms:

What is optimization?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

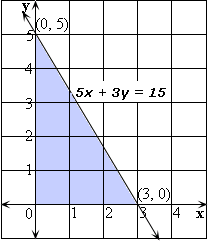
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is an Objective Function?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What are constraints?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&uact=8&docid=pYYvCho4krgDDM&tbnid=dXXyM-mREkp9nM:&ved=0CAUQjRw&url=http://www.northstarmath.com/sitemap/LinearProgramming.html&ei=oT5hU4TSNOTz0gWL_YH4CA&bvm=bv.65636070,d.aWw&psig=AFQjCNFdagF3hRwD1tlNfI1Vwk6nWVt5bQ&ust=1398968293482498)

All of the points in the shaded region are the feasible solutions to the problem.

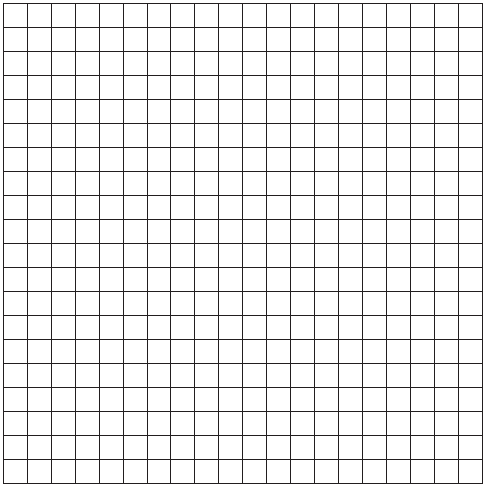
The optimal solution of this linear programming problem however will occur at one of the vertices .

Solving a linear programming problem:

1. Find the maximum value of , the objective function subject to the following constraints:



1. Sketch the solution to set of inequalities in the constraints
2. Find the vertices of the region
3. Test the objective function at each of the vertices and select the values that optimize the function (give you the largest value)



What are we looking for?

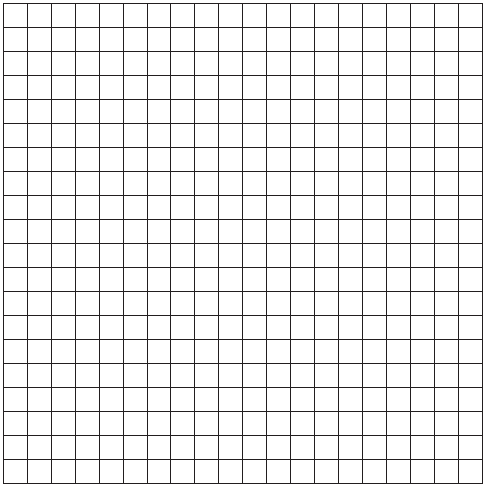
For fun, let’s test some points inside the feasible region.

Does the maximum value of the objective function occur at one of the vertices?

1. Find the minimum value of , where , subject to the following

constraints:





What are we looking for in this case?

1. A manufacturer wants to optimize the profit for two products. Product I yields a profit of $1.50 per unit, and product II yields a profit of $2.00 per unit. Market tests and available resources have indicated the following constraints:

* The combined production level should not exceed 1,200 units month.
* The demand for product II is no more than half the demand for product I.
* The production level of product I is less than or equal to 600 units plus three times the production level of product II

Find the level that maximizes the profit with the given restraints.

Let x = and y =

Objective Function:

Constraint Inequalities:

