

Name _____

Date _____

Advanced Algebra
Unit 6: Advanced Systems of Equations
Linear Programming Problems

Cookies:

Abby and Thomas Woo own a small bakery that specializes in cookies. They make only two kinds of cookies- plain and iced. They need to decide how many dozens of each kind of cookie to make for tomorrow.

The Woo's know each dozen of their plain cookies requires 1 pound of cookie dough (and no icing), and each dozen of their iced cookies requires .7 pounds of cookie dough and .4 pounds of icing. The Woo's also know that each dozen of the plain cookies requires about .1 hours of preparation time, and each dozen of the iced cookies requires about .15 hours of preparation time. Finally, they know that no matter how many of each kind they make, they will be able to sell them all.

The Woo's decision is limited by three factors.

- The ingredients they have on hand- they have 110 pounds of cookie dough and 32 pounds of icing.
- The amount of oven space available-they have room to make a total of 140 dozen cookies for tomorrow.
- The amount of preparation time available-together they have 15 hours for cookie preparation.

They would like to make as much money as possible. The plain cookies sell for \$6.00 a dozen and cost \$4.50 to make. The iced cookies sell for \$7.00 a dozen and cost \$5.00 to make.

You need to make your feasible region so that you can answer the following question:

How many dozens of each kind of cookie should Abby and Thomas make so that their profit is as much as possible?

Rock N Rap

The Hits on Shoestring music company is planning its next month's work. The company makes CD's of both rock and rap music.

It costs the company an average of \$15,000 to produce a rock CD and an average of \$12,000 to produce a rap CD. The higher cost for the rock CD's comes from needing more instrumentalists for rock CD's. Also it takes about 18 hours to produce a rock CD and about 25 hours to produce a rap CD.

The company can afford to spend up to \$150,000 on production next month. Also, according to its agreement with the employee union, the company will spend at least 175 hours on production.

Hits on a Shoestring earns \$20,000 in profit on each rock CD it produces and \$30,000 in profit on each rap CD it produces. But the company recently promised its distributor that it would **not release more rap music than rock music**, because the distributor thinks that the company is more closely associated with rock in the public mind.

The company needs to decide how many of each type of CD to make. Note: The company can make a fraction of a CD and finish it the month after.

- 1) Make your organizational chart
- 2) Find your constraints
- 3) Graph the feasible region
- 4) Test all the corner points to find the combination of CD's that gives the company the most profit. Show that work. Remember the profit is 20,000 on rock and 30,000 on rap.