Date _____

9.3 Linear Programming

FM.O.2 Use geometric and algebraic techniques to solve optimization problems with and without technology.

Linear Programming - _____

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Maximization - _____

Minimization - _____

Ex. 1 Ace Novelty wishes to produce two types of souvenirs: type A and type B. Each type-A souvenir will result in a profit of $1, and each type-B souvenir will result in a profit of $1.20. To manufacture a type-A souvenir requires 2 minutes on machine I and 1 minute on machine II. A type-B souvenir requires 1 minute on machine I and 3 minutes on machine II. There are 3 hours available on machine I and 5 hours available on machine II for processing the order. How many souvenirs of each type should Ace make in order to maximize its profit?

	Type-A	Type-B	Time Available
Machine I			
Machine II			
Profit/Unit			

Let x be the number of type-A souvenirs sold and let y be the number of type-B souvenirs sold. Find the equation for profit and amount of time using each machine.

Ex. 2 A nutritionist advises an individual who is suffering from iron and vitamin-B deficiency to take at least 2400 milligrams (mg) of iron, 2100 mg of Vitamin B_1 (thiamine), and 1500 mg of vitamin B_2 (riboflavin) over a period of time. Two vitamin pills are suitable, brand A and brand B. Each brand A pill contains 40 mg of iron, 10 mg of vitamin B_1, and 5 mg of vitamin B_2, and costs 6 cents. Each brand B pill contains 10 mg of iron, 15 mg of vitamin B_1, and 15 mg of vitamin B_2, and costs 8 cents. What combination of pills should the individual purchase in order to meet the minimum iron and vitamin requirements at the lowest cost?

	Brand A	Brand B	Min. Requirement
Iron			
Vitamin B_1			
Vitamin B_2			
Cost/Pill			

Let x be the number of brand A pills and y be the number of brand B pills to be purchased. Find the equation for cost (in cents) and amount of each nutrition in each pill. Then graph the equations below.