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**Unit 2 Prerequisite 2** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Solving Linear Programming Problems:

1. A potter is making cups and plates. It takes her 6 minutes to make a cup and 3 minutes to make a plate. Each cup uses 3/4 lb. of clay and each plate uses one lb. of clay. She has 20 hours available for making the cups and plates and has 250 lbs. of clay on hand. She makes a profit of $2 on each cup and $1.50 on each plate. How many cups and how many plates should she make in order to maximize her profit? And what would be the maximum profit?

Decision Variables: Constraints:

Objective Function:

Optimal Solution: Maximum:

1. A calculator company produces a scientific calculator and a graphing calculator. Long-term projections indicate an expected demand of at least 100 scientific and 80 graphing calculators each day. Because of limitations on production capacity, no more than 200 scientific and 170 graphing calculators can be made daily. To satisfy a shipping contract, a total of at least 200 calculators much be shipped each day.

If each scientific calculator sold results in a $2 loss, but each graphing calculator produces a $5 profit, how many of each type should be made daily to maximize net profits? And what would be the maximum profit?

Decision Variables: Constraints:

Objective Function:

Optimal Solution: Maximum:

1. A farmer has 25 days to plant cotton and soybeans. The cotton can be planted at a rate of 9 acres per day, and the soybeans at a rate of 12 acres per day. The farm has 275 acres available. However, the farmer only has enough cotton to plant at most 20 acres of cotton. If the profit for cotton is $25 per acre and profit for soybeans is $18 per acre, how days should he spend planting each to maximize profit? And what would be the maximum profit?

Decision Variables: Constraints:

Objective Function:

Optimal Solution: Maximum:

1. A plant makes aluminum and copper wire. Each pound of aluminum wire requires 5 kwh of electricity and 1/4 hr. of labor. Each pound of copper wire requires 2 kwh of electricity and ½ hr. of labor. Production of copper wire is restricted by the fact that raw materials are available to produce at most 60 lbs per day. Electricity is limited to 500 kwh per day and labor to 40 hrs per day. If the profit from aluminum wire is $.25/lb. and the profit from copper is $.40/lb., how much of each should be produced to maximize profit and what is the maximum profit?

Decision Variables: Constraints:

Objective Function:

Optimal Solution: Maximum:

1. A company makes two types of sofas, regular and long, at two locations, one in Hickory and one in Lenoir. The plant in Hickory has a daily operating budget of $45,000 and can produce at most 300 sofas daily in any combination. It costs $150 to make a regular sofa and $200 to make a long sofa at the Hickory plant. The Lenoir plant has a daily operating budget of $36,000, can produce at most 250 sofas daily in any combination and makes a regular sofa for $135 and a long sofa for $180. The company wants to limit production to a maximum of 250 regular sofas and 150 long sofas each day. If the company makes a profit of $50 on each regular sofa and $70 on each long sofa, how many of each type should be made at each plant in order to maximize profit? What is the maximum profit?

Decision Variables: Constraints:

Objective Function:

Optimal Solution: Maximum: