MIG b

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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 to maximize her profit? And what would be the maximum profit?

Decision Variables:

Objective Function:

Constraints:

Optimal Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Maximum: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A farmer has 25 days to plant cotton and wheat. The cotton can be planted at a rate of 9 acres a day, and the wheat at a rate of 12 acres a day. The farm has 275 acres available. However, the farmer needs to spend at least 5 days planting wheat to feed his livestock. If the farmer makes $225 for each day he plants cotton and $216 for each day he plants wheat, how many days should he spend planting each to maximize profit? And what would be the maximum profit?

Decision Variables:

Objective Function:

Constraints:

Optimal Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Maximum: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A plant makes aluminum and copper wire. Each pound of aluminum wire requires 5 kilowatt hours (kwh) of electricity and 1/4 hour of labor. Each pound of copper wire requires 2 kwh of electricity and ½ hour of labor. Due to a shortage, copper wire is restricted to at most 60 lbs per day. Electricity and labor hours are also limited to 500 kwh and 40 hours 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:

Objective Function:

Constraints:

Optimal Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Maximum: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A factory makes fruit filled breakfast bars and granola bars. Each case of breakfast bars takes 2 machine hours and 5 labor hours to produce and each case of granola bars takes 6 machine hours and 4 labor hours to produce. The factory is limited to a maximum of 150 machine hours and 155 labor hours. If each case of breakfast bars nets a profit of $40 and granola nets a profit of $55, how many should the factory produce to maximize profits?

Decision Variables:

Objective Function:

Constraints:

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 110 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 250 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:

Objective Function:

Constraints:

Optimal Solution: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Maximum: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_