MIG

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**Unit 5 Prerequisite 1** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Integer Programming

1. Objective Function: Constraints:

0.5x + y = P 3x + 4y ≤ 18

x ≤ 5

Optimal Solution: Maximum Profit:

Sentence: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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2. Objective Function: Constraints:

2x + y = C 5x + 3y ≥ 19

2x + 2y ≥ 5

Optimal Solution: Minimum Cost:

Sentence: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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3. Objective Function: Constraints:

12x + 2.75y = C 12x + 7y ≥ 38

3x + 2y ≥ 37

x + y < 13.25

Optimal Solution: Minimum Cost:

Sentence: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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4. Objective Function: Constraints:

6.25x + 4.3y = C 2x + 8y < 203

y ≥ 12.75

12x + 9y > 62

Optimal Solution: Maximum Cost:

Sentence: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. A mother is making children’s dresses and coats to sell. It takes her 1 hour to make a dress and 30 minutes to make a coat. Each dress uses ¾ yds of fabric and each coat uses 1 yd of the same fabric. She has 8 yds of fabric and 7 hours available to make the clothing. She also must make at least 2 coats to display for her display. If she sells the dresses for $40 and the coats for $35.75, how many of each should she make in order to maximize her profit?

Decision Variables: Constraints:

Objective Function:

Optimal Solution: Maximum Profit:

Sentence: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Bountiful Boats has to produce at least 5000 cabin cruisers and 12,000 pontoons each year; they can produce at most 30,000 jet skis in a year.  The company has two factories:  one in Michigan, and one in Wisconsin.  The Michigan factory makes 23 cabin cruisers, 41 pontoons, and 60 jet skis per day and is open for a maximum of 240 days per year.  The Wisconsin factory makes 17 cruisers, 37 pontoons, and 50 jet skis per day and is also open for a maximum of 240 days per year.  The cost to run the Michigan factory per day is $960,000; the cost to run the Wisconsin factory per day is $750,000.  How many days of the year should each factory run in order to meet the boat production, yet do so at a minimum cost?

Decision Variables: Constraints:

Objective Function:

Optimal Solution: Minimum Cost:

Sentence: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Integers do not include what types of numbers? \_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. When using Integer Programming, which cannot contain decimals?

*Circle one* THE OPTIMAL SOLUTION or THE MAXIMUM/MINIMUM