MIG

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**Unit 5 Review 2** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Determine if the following decision variables should be evaluated using Linear Programming (LP) or Integer Programming (IP). Circle your choice for each question.

**Remember that:**

LP – *means the decision variables can be decimals.*

IP – *means the decision variables can NOT be decimals.*

1. *x1* = days spent planting corn

LP or IP

*x2*= days spent planting wheat

1. *x1* = amount of weight gained with diet A

LP or IP

*x2*= amount of weight gained with diet B

*x3* = amount of weight gained with diet C

1. *x1* = number of type A trucks rented

LP or IP

*x2*= number of type B trucks rented

1. *x1* = number of tons of ore produced at factory A

LP or IP

*x2*= number of tons of ore produced at factory B

1. *x1* = amount of turkey sandwiches

LP or IP

*x2*= amount of ham sandwiches

*x3* = amount of deluxe sandwiches

1. *x1* = amount of managers

LP or IP

*x2*= amount of assistant managers

*Solve the following to answer the questions. Be sure to create an Answer Report to answer the follow-up questions.*

1. The MIG test consists of non-Excel based problems and Excel based problems. Non-Excel based problems are worth 6 points and Excel based problems are worth 10 points. Your average time completing non-Excel based problems is 2.1 minutes and Excel based problems in 4.1 minutes. You have 40 minutes to complete the test and may complete no more than 12 problems to answer. Assuming that you answer all the problems chosen correctly, how many of each type should you answer to get the highest score?

Decision Variables: Constraints:

Objective Function:

What is the optimal solution in context of the problem? What is the maximum in context of the problem?

Describe the binding constraints in context.

Describe the slack on the non-binding constraints in context.

1. Machine A can produce 33 steering wheels per hour at a cost of $16 per hour. Machine B can produce 47 steering wheels per hour at a cost of $22 per hour. At least 360 steering wheels must be made each shift. Because the machines must have preventative maintenance at the end of a shift, each machine can run no longer than 8 hours. This means machine A can run up to 8 hours and machine B can run up to 8 hours. How many hours should each machine run in order to minimize the cost in producing the steering wheels?

Decision Variables: Constraints:

Objective Function:

What is the optimal solution in context of the problem? What is the minimum in context of the problem?

Describe the binding constraints in context.

Describe the slack on the non-binding constraints in context.

1. A company plans to make 3 models (A, B, and C) of the same type of car next month. Profit on model A is $4000, model B is $5200 and model C is $3000. Production capacity is limited to 100 total - each model takes the same amount of production time. However, a supplier problem results in only 500 gallons of paint being available next month. Each Model A requires 5 gallons of paint, each Model B requires 7 gallons and each Model C requires 10 gallons. Marketing wants the following mix: exactly 20 Model A's; at least 5 Model B's; and no less than 8 Model C's. Determine the production mix that would produce the maximum profit.

Decision Variables: Constraints:

Objective Function:

What is the optimal solution in context of the problem? What is the maximum in context of the problem?

Describe the binding constraints in context.

Describe the slack on the non-binding constraints in context.