**Operations Research Project Report**

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**Topic: Linear Programming Models**

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**Section:** SE – 5A

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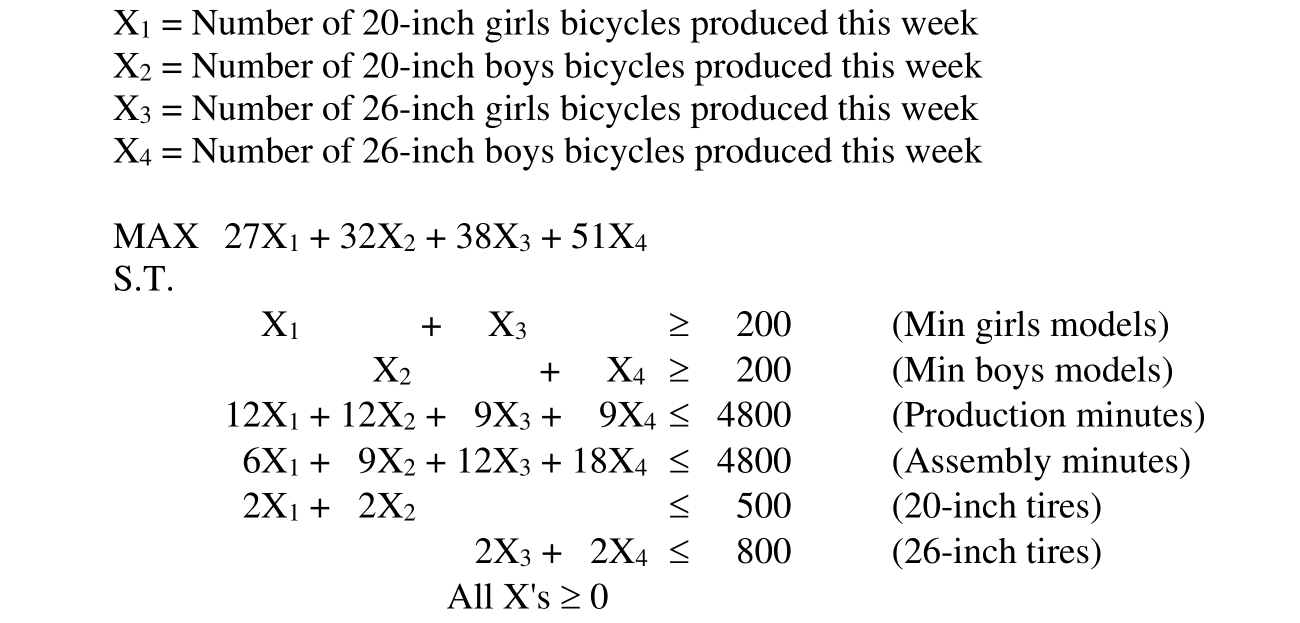
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# **Problem 1**



## **Solution:**

x1 = 150.0 Reduced Cost = -0.0

x2 = 100.0 Reduced Cost = -0.0

x3 = 100.0 Reduced Cost = -0.0

x4 = 100.0 Reduced Cost = -0.0

Optimal Value: 16150.0

## **Interpretation of Results:**

The optimal Value of this problem is 16150.0. Furthermore, the cost reduced per unit of decision variable is 0.0. This means that the cost won’t be reduced per unit decrease the value of the decision variable.

# **Problem 2**

Text

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## **Solution:**

x1 = 266.667 Reduced Cost = 0.0

x2 = 448.718 Reduced Cost = 0.0

x3 = 0.0 Reduced Cost = -11.538

x4 = 0.0 Reduced Cost = -8.269

x5 = 133.333 Reduced Cost = 0.0

Optimal Value: 87051.2821

## **Interpretation of Results:**

The optimal Value of this problem is 87051.2821. Furthermore, the cost reduced per unit of some decision variables is non-zero. This means that the cost will be reduced per unit decrease the value of the decision variable.

# **Problem 3**

Text

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## **Solution:**

x1 = 22.936 Reduced Cost = -0.0

x2 = 0.0 Reduced Cost = -44.954

x3 = 22.936 Reduced Cost = -0.0

x4 = 45.872 Reduced Cost = -0.0

x5 = 91.743 Reduced Cost = -0.0

Optimal Value: 54128.4408

## **Interpretation of Results:**

The optimal Value of this problem is 54128.4408. Furthermore, the cost reduced per unit of some decision variables is non-zero. This means that the cost will be reduced per unit decrease the value of the decision variable.

# **Problem 4**

Text, letter

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## **Solution:**

x1 = 7500.0 Reduced Cost = 0.0

x2 = 0.0 Reduced Cost = -0.03

x3 = 2500.0 Reduced Cost = 0.0

x4 = 30000.0 Reduced Cost = 0.0

x5 = 0.0 Reduced Cost = -0.125

x6 = 10000.0 Reduced Cost = 0.0

x7 = 10000.0 Reduced Cost = 0.0

Optimal Value: 5250.0

## **Interpretation of Results:**

The optimal Value of this problem is 5250.0. Furthermore, the cost reduced per unit of some decision variables is non-zero. This means that the cost will be reduced per unit decrease the value of the decision variable.

# **Problem 5**

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## **Solution:**

x1 = 240.0 Reduced Cost = 0.0

x2 = 312.0 Reduced Cost = 0.0

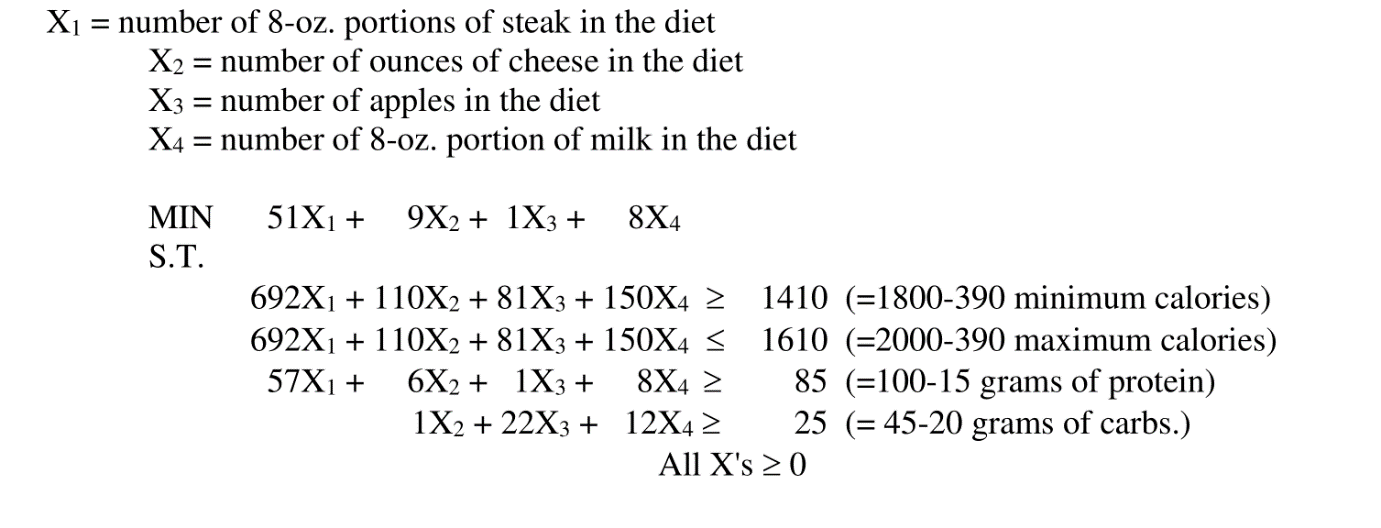
x3 = 120.0 Reduced Cost = -1.35

Optimal Value: 5568.0

## **Interpretation of Results:**

The optimal Value of this problem is 5568.0. Furthermore, the cost reduced per unit of some decision variables is non-zero. This means that the cost will be reduced per unit decrease the value of the decision variable.

# **Problem 6**



## **Solution:**

x1 = 1.395 Reduced Cost = 0.0

x2 = 0.0 Reduced Cost = 3.575

x3 = 5.49 Reduced Cost = 0.0

x4 = 0.0 Reduced Cost = 0.761

Optimal Value: 76.6306

## **Interpretation of Results:**

The optimal Value of this problem is 76.6306. Furthermore, the cost reduced per unit of some decision variables is non-zero. This means that the cost will be reduced per unit decrease the value of the decision variable.

# **Problem 7**

Text

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## **Solution:**

x1 = 325.0 Reduced Cost = 0.0

x2 = 100.0 Reduced Cost = 0.0

x3 = 375.0 Reduced Cost = 0.0

x4 = 425.0 Reduced Cost = 0.0

Optimal Value: 143250.0

## **Interpretation of Results:**

The optimal Value of this problem is 143250.0. Furthermore, the cost reduced per unit of decision variable is 0.0. This means that the cost won’t be reduced per unit decrease the value of the decision variable.

# **Problem 8**

Text, letter

Description automatically generated

## **Solution:**

x1 = 2.0 Reduced Cost = -0.0

x2 = 0.0 Reduced Cost = -100.0

x3 = 4.0 Reduced Cost = -0.0

Optimal Value: 4000.0

## **Interpretation of Results:**

The optimal Value of this problem is 4000.0. Furthermore, the cost reduced per unit of some decision variables is non-zero. This means that the cost will be reduced per unit decrease the value of the decision variable.

# **Problem 9**

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Description automatically generated

## **Solution:**

x1 = 500.0 Reduced Cost = 0.0

x2 = 600.0 Reduced Cost = 0.0

x3 = 200.0 Reduced Cost = 0.0

x4 = 200.0 Reduced Cost = 0.0

x5 = 500.0 Reduced Cost = 0.0

x6 = 0.0 Reduced Cost = 8.0

x7 = 0.0 Reduced Cost = 20.0

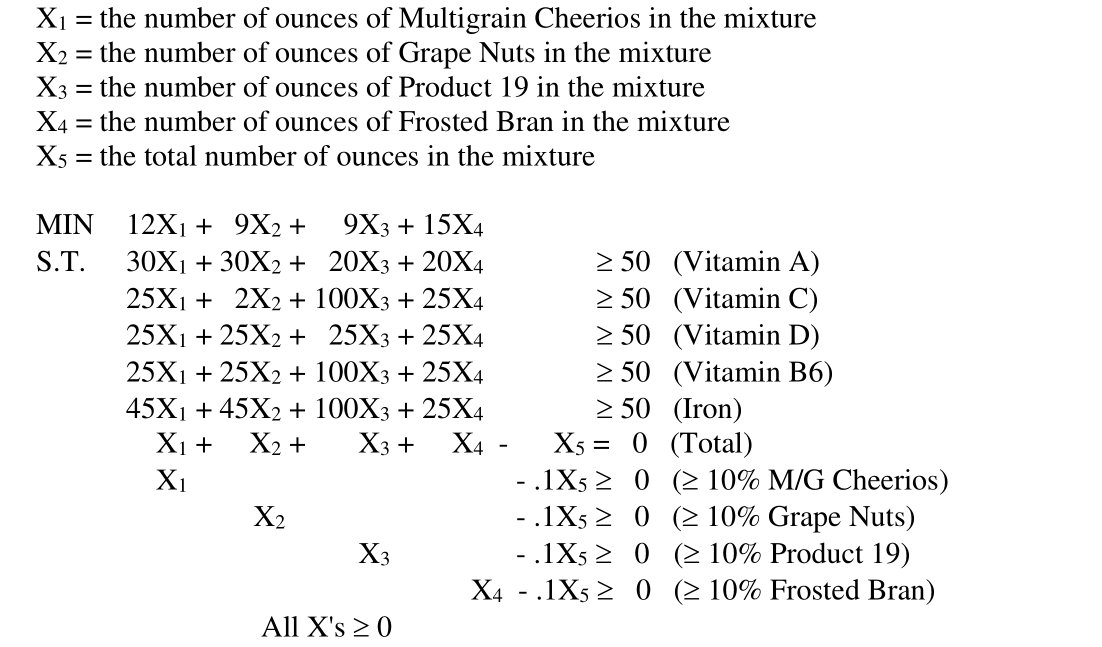
x8 = 0.0 Reduced Cost = 12.0

Optimal Value: 39800.0

## **Interpretation of Results:**

The optimal Value of this problem is 39800.0. Furthermore, the cost reduced per unit of some decision variables is non-zero. This means that the cost will be reduced per unit decrease the value of the decision variable.

# **Problem 10**



## **Solution:**

x1 = 0.2 Reduced Cost = 0.0

x2 = 1.224 Reduced Cost = 0.0

x3 = 0.376 Reduced Cost = 0.0

x4 = 0.2 Reduced Cost = 0.0

x5 = 2.0 Reduced Cost = 0.0

Optimal Value: 19.8

## **Interpretation of Results:**

The optimal Value of this problem is 19.8. Furthermore, the cost reduced per unit of decision variable is 0.0. This means that the cost won’t be reduced per unit decrease the value of the decision variable.

# **Problem 11**

Table

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## **Solution:**

x1 = 14550.0 Reduced Cost = 0.0

x2 = 4000.0 Reduced Cost = -0.0

x3 = 15000.0 Reduced Cost = 0.0

Optimal Value: 2777000.0

## **Interpretation of Results:**

The optimal Value of this problem is 2777000.0. Furthermore, the cost reduced per unit of decision variable is 0.0. This means that the cost won’t be reduced per unit decrease the value of the decision variable.

# **Problem 12**

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Description automatically generated

## **Solution:**

x1 = 101.803 Reduced Cost = -0.0

x2 = 150.0 Reduced Cost = -0.0

x3 = 87.541 Reduced Cost = -0.0

x4 = 339.344 Reduced Cost = 0.0

Optimal Value: 1083.418

## **Interpretation of Results:**

The optimal Value of this problem is 1083.418. Furthermore, the cost reduced per unit of decision variable is 0.0. This means that the cost won’t be reduced per unit decrease the value of the decision variable.

# **Problem 13**

Text, letter

Description automatically generated

## **Solution:**

x1 = 30240000.0 Reduced Cost = -0.0

x2 = 66666.667 Reduced Cost = 0.0

x3 = 20093333.0 Reduced Cost = 0.0

x4 = 12600000.0 Reduced Cost = -0.0

x5 = 5000000.0 Reduced Cost = 0.0

x6 = 50400000.0 Reduced Cost = -0.0

x7 = 63000000.0 Reduced Cost = 0.0

Optimal Value: 17879399.9525

## **Interpretation of Results:**

The optimal Value of this problem is 17879399.9525. Furthermore, the cost reduced per unit of decision variable is 0.0. This means that the cost won’t be reduced per unit decrease the value of the decision variable.

# **Problem 14**

Text

Description automatically generated

## **Solution:**

Mobile\_home\_cabinets\_produced\_in\_overtime\_in\_August = 131.0 Reduced Cost = 0.0

Mobile\_home\_cabinets\_produced\_in\_overtime\_in\_July = 95.0 Reduced Cost = 0.0

Mobile\_home\_cabinets\_produced\_in\_overtime\_in\_September = 0.0 Reduced Cost = 6.0

Mobile\_home\_cabinets\_produced\_in\_regular\_time\_in\_August = 150.0 Reduced Cost = 0.0

Mobile\_home\_cabinets\_produced\_in\_regular\_time\_in\_July = 285.0 Reduced Cost = 0.0

Mobile\_home\_cabinets\_produced\_in\_regular\_time\_in\_September = 144.0 Reduced Cost = 0.0

Mobile\_home\_cabinets\_stored\_in\_August = 281.0 Reduced Cost = 0.0

Mobile\_home\_cabinets\_stored\_in\_July = 300.0 Reduced Cost = 0.0

Mobile\_home\_cabinets\_stored\_in\_September = 25.0 Reduced Cost = 0.0

Motor\_home\_cabinets\_stored\_in\_August = 0.0 Reduced Cost = 0.6

Motor\_home\_cabinets\_stored\_in\_July = 0.0 Reduced Cost = 3.0

Motor\_home\_cabinets\_stored\_in\_September = 10.0 Reduced Cost = 0.0

cabinets\_produced\_in\_overtime\_in\_August = 0.0 Reduced Cost = 0.0

cabinets\_produced\_in\_overtime\_in\_July = 0.0 Reduced Cost = 0.0

cabinets\_produced\_in\_overtime\_in\_September = 0.0 Reduced Cost = 3.6

cabinets\_produced\_in\_regular\_in\_July = 225.0 Reduced Cost = 0.0

cabinets\_produced\_in\_regular\_time\_in\_August = 250.0 Reduced Cost = 0.0

cabinets\_produced\_in\_regular\_time\_in\_September = 160.0 Reduced Cost = -0.0

Optimal Value: 367969.0

## **Interpretation of Results:**

The optimal Value of this problem is 367969.0. Furthermore, the cost reduced per unit of some decision variables is non-zero. This means that the cost will be reduced per unit decrease the value of the decision variable.

# **Problem 15**

Table

Description automatically generated

## **Solution:**

x1 = 142.857 Reduced Cost = 0.0

x2 = 142.857 Reduced Cost = -0.0

x3 = 0.0 Reduced Cost = -444.0

x4 = 14.286 Reduced Cost = -0.0

Optimal Value: 197199.9961

## **Interpretation of Results:**

The optimal Value of this problem is 197199.9961. Furthermore, the cost reduced per unit of some decision variables is non-zero. This means that the cost will be reduced per unit decrease the value of the decision variable.