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Decision Models Classwork 03

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**Algebraic Formulation**

ni = # of reps assigned to district i

DCij = # of calls to be made from reps of district i to district j

yi = 1 if any reps in i, 0 otherwise

**Objective Function:**

Min. 80n1+80n2+80n3+80n4 + 88yi + 88y2 + 88y3 + 88y4

**Subject to Constraints:**

**Sales Rep. hours/mo. capacity**

0.9X11­ ­­+ 4.1X12 + 5.4X13 + 6.8X14­ <= 160n1

3.3X21 + 1.74X22 + 2.6X23 + 5.3X24 <= 160n2

4.5X31 + 3.0X32 + 1.4X33 + 1.9X34 <= 160n3

6.5X41 + 5.3X42 + 2.4X43 + 1.3X44 <= 160n4

**# of Calls**

­ X11 + X21 + X31 + X41 >= 150

X12 + X22 + X32 + X42 >= 240

X13 + X12 + X13 + X14 >= 300

X14 + X24 + X34 + X44 >= 180

**Linking Constraints**

n1 <= M1yi

n2 <= M2y2

n3 <= M3y3

n4 <= M4y4

**Maximum # of Hours for District 1:**

150\*0.9 + 240\*4.1 + 300\*5.4 + 180\*6.8 = 3,964

**M1 = 3,964/160 = 25**

**Maximum # of Hours for District 2:**

150\*3.3+240\*1.7+300\*2.6+180\*5.3 = 2,637‬

**M2 = 2,637‬/160 = 17**

**Maximum # of Hours for District 3:**

150\*4.5 + 240\*3.0 + 300\*1.4 + 180\*1.9 = 2,157‬

**M3 = 2,157‬/160 = 14**

**Maximum # of Hours for District 4:**

150\*6.5 + 240\*5.3 + 300\*2.4 + 180\*1.3 = 3,201

**M2 = 3,201/160 = 21**