# ASSIGNMENT 3 CHE 5480

***DUE: March 4: Send through e-mail. Include the GAMS and Excel files and a narrative explaining what was done and how.***

## #Problem 1

Consider the following problem:

Max $4x+y$

**Subject To:**

$x \cdot y \leq 4$

$0.64X \leq y$

$0 \leq x \leq 4$

$0 \leq y \leq 8$

***- Draw the feasible region.***
***- Identify the optimum by inspection.***
***-Pick a starting point and illustrate the steps of the following methods***
***-penalty***
***-barrier***
***-Augmented lagrangian***
***-SLP (use the following starting points: (1,7), (0,0) and (6,5)***

***- Use GAMS/CONOPT, or GAMS /CPLEX when appropriate to solve each step.***

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## #Problem 2

Consider the following problem:

Min $(x-3)^2+(y-2.5)^2$

**Subject To:**

$x \cdot y \leq 4$

$0.64X \leq y$

$0 \leq x \leq 4$

$0 \leq y \leq 8$

***- Draw the feasible region.***
***- Identify the optimum by inspection.***
***-Check the KKT conditions.***
***-Do sufficient conditions hold?***
***-Pick a starting point and illustrate the steps of the following methods***
***-SLP***

*-SQP*
*-GRG (Make sure that you identify basic, non-basic and superbasic variables)*

***- Use GAMS/CONOPT, or GAMS /CPLEX when appropriate to solve each step.***

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## #Problem 3

Problem 8.26 (Himmelblau book ; chapter 8)

## #Problem 4

Problem 8.31 (Himmelblau book ; chapter 8)

## #Problem 5

Problem 9.9 (Himmelblau book ; chapter 9) Illustrate all the steps of the branch and bound procedure. Use GAMS for the lp. Confirm your results running the MILP (using the mip option).

## #Problem 6

Consider the following problem:

Min $2x+y$

**Subject To:**

$1.25-x^2-y \leq 0$
$x+y \leq 1.6$
$0 \leq x$
$y=0,1$ (binary)

***- Draw the feasible region.***
***- Identify the optimum by inspection.***
***-Pick a starting point and illustrate the steps of the outer approximation algorithm.***
***- Show if there are multiple optima.***
***- Use GAMS/CONOPT, or GAMS /CPLEX when appropriate to solve each step.***

Repeat for an objective function Min $2x^2+y$