Key Problems

Problem 1.
Use the SOC to show that the given point is a solution of the constrained optimization problem:

a) $(x^*,y^*) = (1,1)$ is a minimum for: $\min f(x,y) = x^2 + y^2$ when $xy = 1$

b) $(x^*,y^*,z^*) = (2,0,0)$ is a minimum for: $\min f(x,y,z) = x^2 + y^2 + z^2$ when $3x^2 + 2y^2 + 2z^2 \geq 12$

Problem 2.
Determine if there are any admissible points such that the NDCQ fails when the constraints are given by:

a) $xyz = 1$

b) $3x^2 + 3y^2 + 8z^2 \geq 1$

c) $x^3 + y^3 + z^3 = 0$

d) $xy - zw = 1$ and $x + y + z + w = 4$

Problem 3.
Solve the constrained optimization problems:

a) $\max f(x,y,z) = 2 - x^2 + 4xy - 5y^2 + 2yz - 2z^2$ when $3x - 2y + z = 10$

b) $\max f(x,y,z,w) = xz + yw$ when $x^2 + y^2 \leq 1$ and $4z^2 + 9w^2 \leq 36$

Problems from the Workbook

Workbook [W]	8.1 - 8.13 (full solutions in the workbook)
Final exams	11/2017 Question 3-4, 11/2018 Question 3-4

Answers to Key Problems

Problem 2.

a) None

b) None

c) $(x,y,z) = (0,0,0)$

d) None

Problem 3.

a) $f_{\max} = 0$

b) $f_{\max} = 3$

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