

Quiz 9 – 20 November 2019

Instructions. You have 15 minutes to complete this quiz. You may use your calculator. You may not use any other materials (e.g., notes, homework, books).

Show all your work. To receive full credit, your solutions must be completely correct, sufficiently justified, and easy to follow.

Problem	Weight	Score
1	1	
2	2	
Total		/ 30

For this quiz, consider the following optimization problem:

$$\begin{array}{ll} \text{minimize/maximize} & xyz \\ \text{subject to} & 2x + 3y + z = 6 \end{array}$$

Problem 1. Write a system of equations whose solutions are the constrained critical points for this optimization problem. Do not solve the system of equations.

Grading.

- I split Problem 2 into two parts:
 - a. Find the Hessian at the given constrained critical point $(0, 0, 0, 6)$.
 - b. Classify this point as a constrained local minimum, constrained local maximum, or constrained saddle point.
- You received a score for each part: $a + b$.
- Each part has a weight of 1.

Notes.

- This problem was based on problems 16.1b and 16.2b from the textbook, assigned for homework.
- Take a look at the solutions for those problems for guidance.

Here is the optimization problem again for your convenience:

$$\begin{array}{ll} \text{minimize/maximize} & xyz \\ \text{subject to} & 2x + 3y + z = 6 \end{array}$$

Problem 2. One of the constrained critical points for this optimization problem is $(\lambda, x, y, z) = (0, 0, 0, 6)$. Classify this point as a constrained local minimum, constrained local maximum, or constrained saddle point.