## Assignment 1

1. We consider the problem

$$\max_{x^3 + y^3 - 3xy + 1 = 0} x + y.$$

Calculate the solution to this problem (we admit the existence of a maximum).

2. We consider the optimization problem

$$\min_{\substack{x,y,z\ge0\\xyz=2}} xy + 2yz + 2xz.$$

- (a) Suppose that the problem admits a solution. Write down the necessary condition for optimality and calculate the solution.
- (b) (**Optional**) Prove the existence of the solution.