## Exercise Problems

**Problem 1.**
Use the Kuhn-Tucker conditions to find the minimum value of the function $f(x,y,z) = 2x^2 + y^2 + 3z^2$ on the set $D = \{(x,y,z) \in \mathbb{R}^3 : x - y + 2z \geq 3 \text{ and } x + y \geq 3\}$.

**Problem 2.**
Find the maximum and minimum value of the function $f(x,y) = (xy - x - y + 1)e^{x+y-2}$ defined on the set $D = \{(x,y) \in \mathbb{R}^2 : x^2 + y^2 = 1\}$. What happens if we change the constraint to $x^2 + y^2 \leq 1$?

**Problem 3.**
Use the Kuhn-Tucker conditions to find the maximum value of the function $f(x,y,z) = xy + xz - yz$ defined on the set $D = \{(x,y,z) \in \mathbb{R}^3 : x^2 + y^2 + z^2 \leq 1\}$.