Use Lagrange multipliers to solve each of the following problems.

1.) Minimize \( f(x, y, z) = x^2 + y^2 + z^2 \)
   subject to \( x - y + z = 0 \) and \( -x + 2y - z = 3 \).

2.) Maximize \( f(x, y, z) = 10 - x^2 - 2y^2 - 3z^2 \)
   subject to \( x - y = 5 \) and \( x + y - z = 2 \).

3.) The temperature \( T \) in degrees Fahrenheit at a point \((x, y)\) on a metal plate is given by
   \[
   T = x^2 - 6x + 9 + y^2.
   \]
   An ant, walking on the plate, traverses a circle of radius 5 centered at the origin. What are the highest and lowest temperatures encountered by the ant?