Math 213 Discussion Worksheet – Week 8

1. (a) Find ∇F where $F(x, y) = x^2 + y^2 - 2xy$. (b) Find the rate of change of F along the direction of the vector $\overrightarrow{v} = (1, 1)$.

2. Consider a box of dimensions x, y, z. (a) Maximize the volume of the box $V = xyz$ under the constraint $x + y + z = 3$. (b) Maximize V under the constraint $yz + xz + xy = 3$.

3. Consider a box of dimensions x, y, z. (a) Maximize the area of the box $A = 2yz + 2xz + 2xy$ under the constraint $x + y + z = 3$. (b) Minimize the area under the constraint $xyz = 1$.