Discussion 5

Name and section: _____

1. Find the point (x^*, y^*, z^*) that is at the minimum of the function

$$f(x, y, z) = 2x^2 + 8y^2 + z^2 \tag{1}$$

subject to the constraint equation

$$g(x, y, z) = 6x + 4y + 4z - 72 = 0 \tag{2}$$

2. A circle is centered about the axes and satisfies the equation

$$x^2 + y^2 = 4. \tag{3}$$

Find the point (x^*, y^*) on the circle that is closest to the point $(3, 2)$.

3. You play a slot machine in Las Vegas. For every \$1 coin you insert, there are three outcomes:

    1. you lose your \$1; net profit of $-\$1$
    2. you win \$1; net profit of \$0
    3. you win \$5; net profit of \$4.

    Suppose you believe that your average expected profit over many trials is \$0. Find the maximum entropy distribution for the probabilities p_1, p_2, and p_3 of observing outcomes (1), (2), and (3) respectively.

    (Hint: What are the two constraints for the problem?)