Discussion Section # 4 – February 14, 2014

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

$$f(x,y,z)=2x^2+8y^2+z^2$$

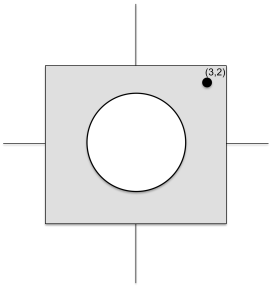
subject to the constraint equation

$$g(x,y,z)=6x+4y+4z-72=0$$

2. **Distance from the circumference of a circle**. The circle shown below is centered about the axes and satisfies the equation

$$x^2+y^2=4.$$

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



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

(1) you lose $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?)