Name:

Math 215 Exam 2

November 8th, 2012

Directions: WRITE YOUR NAME ON THIS EXAM! Except where indicated, merely finding the answer to a problem is not enough to receive full credit; you must show how you arrived at that answer. DO NOT convert irrational numbers such as $\sqrt{3}$ or π into decimal approximations; just leave them as they are.

1) (20 points) Find the equation of the tangent plane to the level surface $8 = xy\sec(yz)$ at the point $(-2, 2, \pi/3)$.

2) (25 points) Find the point on the cylinder $x^2 + y^2 = 18$ that is closest to $(-1, 1, 1)$. (*Hint:* what must the z-coordinate equal?)

3) Consider $\mathcal{R} = \{(x, y) \mid 0 \leq x \leq 4,\ \sqrt{4 - x^2} \leq y \leq \sqrt{16 - x^2}\}$.

a) (5 points) Draw $\mathcal{R}$.

b) (20 points) Compute the value of the integral

$$\int_{\mathcal{R}} \ln(\sqrt{x^2 + y^2})\ dA.$$

4) (20 points) Show that

$$\lim_{(x,y)\to(-6,5)} \frac{x^2y + 36y + 12xy - 5x^2 - 60x - 180}{(x+6)^4 + 9(y-5)^2}$$

does not exist.