

Math 233 Warm Up Problems

September 14, 2009

1. Draw some graphs and level curves

(a) $x^2 + y^2 + 16x^2 = 36$

(b) $z = x + y^2$

(c) $z = x - y^2$

Lecture Problems

2. Compute the partial derivatives

(a) Find $\partial z/\partial x$ and $\partial z/\partial y$ if $z = \sin(xy)$.

(b) Find f_x and f_z if $f(x, y, z) = xyz^2 + e^{yz}$.

(c) Find D_1f and D_2 if $f(x, y, z) = \frac{xy}{z^2}$

3. (a) Let $f(x, y) = \frac{x^4+1}{y^5}$. Find ∇f .

(b) Let $f(x, y, z) = xyz$. Find ∇f .

(c) Let $f(x, y, z, w) = xyzw \sin x$. Find ∇f .

4. Let $f(x, y) = x^2 - y^2$. Let $P = (3, -1)$, $Q = (2.8, -1)$ and $R = (3, -0.7)$ Compute $\nabla f(P)$

(a) Use the gradient to describe by how much the function value changes when you move from point P to point Q .

(b) Use the gradient to describe by how much the function value changes when you move from point P to point R .