Math 115, Quizz 2

Name:
Date: Wednesday September 25
Duration: 20 min.

Problem 1:

1. Compute the modulus of $\vec{u} = 12\vec{i} + 5\vec{j}$, $|\vec{u}|$.

2. Find the derivative of the function $f(x, y) = \dfrac{x - y}{xy + 2}$ at $P_0(1, -1)$ in the direction described by the vector $\vec{u}$.

Problem 2:

Find the value of $\partial z / \partial x$ at the point $(1, 1, 1)$ if the equation

$$xy + z^3 x - 2yz = 0$$

defines z as a differentiable function of x and y.

Problem 3:

Consider $f(x, y) = x^2 - 2x + y^2$.

1. Show that the level curve $f(x, y) = 3$ is a circle centered at $(1, 0)$ with radius $R = 2$ (that is, show that the level curve can be written as $(x - 1)^2 + y^2 = 4$).

2. Sketch that level curve together with ∇f and the tangent line at the point $P_0(2, \sqrt{3})$.

3. Write an equation for the tangent line and an equation for the normal line at that point P_0.