

14.3: Tangent Planes and Differentials

Calculus III

College of the Atlantic. Winter 2017

1. Let $f(x, y) = x^2 + y^2$.
 - (a) Find the equation of the plane that is tangent to $f(x, y)$ at the point $(1, 2)$.
 - (b) Use the tangent plane to approximate $f(0.9, 2.2)$ and compare it to the exact value.
 - (c) Is your approximation above or below the true value? Explain this geometrically.
2. Find the equation of the tangent plane to the surface $z = x^3 - y^3$ at $(x, y) = (2, 3)$.
3. Find the differential of the function $g(x, y) = y^2e^{-x}$ at $(x, y) = 1, 2$.
4. Find the differential of the function $P(\rho, v) = k\rho v^3$, where k is a constant.