MATH 124 – Fall 2004 Extra credit (15 points)

Consider the surface S given by the paraboloid $z = 9 - x^2 - y^2$ for $x^2 + y^2 \le 9$.

1. Write parametric representation of the surface of the form X(x, y) = (x, y, f(x, y)) and find a normal pointing up.

2. Write an equation for the tangent plane to the surface at the point on the surface (1, 1, 7).

3. Compute the flux of the vector field F(x, y, z) = (3, 0, 2) across the surface in the direction of the normal pointing up.