Section 14.4: Additional Problems

1. $f(x,y) = x^3 y^4 + e^{y^2-1}$

    (a) Find the equation of the tangent plane to $f(x,y)$ at the point $(2,1,9)$.

    (b) Find the equation of the normal line at the point $(2,1,9)$.

2. $f(x,y) = x^3 y^4 + e^{y^2-1}$

    (a) Find the linearization function at the point $(2,1)$.

    (b) Use the linearization function at the point $(2,1)$ to approximate $f(1.9, 1.2)$

3. Find the differential of these function (total differential).

    (a) $z = e^{-2x} \cos(2y)$

    (b) $R = \alpha\beta^2 \ln(\gamma)$

4. The radius and the height of a right circular cylinder are measured as 3 in. and 8 in., respectively. The possible error of the radius is 0.05 in and a possible error in the height of 0.15 in. Use differentials to estimate the maximum error in the calculated volume of the cylinder.