

**SURVEYING ENGINEERING  
FERRIS STATE UNIVERSITY**

**SURE 372 Adjustment Computations 1  
Homework #7**

**Fall 2005/06**

1. Compute the partial derivatives of the following relationships  $\left( \frac{\partial z}{\partial x_1} \quad \frac{\partial z}{\partial x_2} \quad \frac{\partial z}{\partial y_1} \quad \frac{\partial z}{\partial y_2} \right)$ :

a)  $z = \tan^{-1} \left( \frac{x_2 - x_1}{y_2 - y_1} \right)$

b)  $z = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

2. Given the following equations, compute the higher order partial derivatives

a)  $z = x^2 - y^3$

b)  $z = 5x^4 + 10x^2y^2 + 15y^4$

c)  $z = \sqrt{9 - x^2 - y^2}$

3. Find the total differential,  $dz$ , for the following functions:

a)  $z = x^2y^2 + 3y + 4$

b)  $z = x \sin y$