Student Name:_____   **Student ID:**_____

Q1) Let $z = f(x, y)$ be differentiable function of x and y where

$$x = s^2 t \quad \text{and} \quad y = s - t.$$

Suppose that f is a function with continuous second order partial derivatives satisfying:

$$f_x(4, 1) = 1, \quad f_y(4, 1) = 2, \quad f_{xx}(4, 1) = -3, \quad f_{xy}(4, 1) = -6, \quad f_{yy}(4, 1) = 5$$

a) Find $\frac{\partial z}{\partial s}\big|_{(s,t)=(2,1)}$

b) Find $\frac{\partial^2 z}{\partial t \partial s}\big|_{(s,t)=(2,1)}$