Math 001D Assignment 14.5 Ans____________________________

Instructions: Write complete solutions to the following problems in the space provided. Besure to supply all the necessary steps that lead to your answers.

1. Use the chain rule to find $\dfrac{df}{dt}$

$f(x,y) = x^2 + y^2 - 2xy,\ x(t) = \sin t,\ y = \cos t.$

2. Use the chain rule to find $\dfrac{\partial z}{\partial t}$ and $\dfrac{\partial z}{\partial s}$

$f(x,y) = e^{3x-y},\ x = t/s,\ y = s/t$.

3. Suppose f is a differentiable function of x and y, and $g(u,v) = f(e^u + \sin v, e^u + \cos v)$
Use the table to find the values of $g_u(0,0),\ g_v(0,0)$

	f	g	f_x	f_y
(0,0)	3	6	4	8
(1,2)	6	3	2	5

4. The voltage V in a simple electrical circuit is slowly decreasing as the battery wears out. The resistance R is slowly increasing as the resistor heats up. Use Ohm's Law, $V = IR$, to find how the current I is changing at the moment when $R = 313\ \Omega$, $I = 0.03$ A, $dV/dt = -0.09$ V/s, and $dR/dt = 0.02\ \Omega$/s.
(Round your answer to six decimal places.)

5. One side of a triangle is increasing at a rate of 3 cm/s and a second side is decreasing at a rate of 2 cm/s. If the area of the triangle remains constant, at what rate does the angle between the sides change when the first side is 20 cm long, the second side is 30 cm, and the angle is $\pi / 6$. (Round your answer to three decimal places.)