Worksheet #24

(1) Find $\frac{dw}{dt}$ where $w = e^x \sin y + e^y \sin x$, $x = 3t$ and $y = 2t$.

(2) Find $\frac{\partial z}{\partial t}$ where $z = \ln(x + y) - \ln(x - y)$, $x = te^s$ and $y = e^{st}$. Express your answer in terms of s and t.

(3) If $w = x^2 y + z^2$, $x = \rho \cos \theta \sin \phi$, $y = \rho \sin \theta \sin \phi$, and $z = \rho \cos \phi$, find $\frac{\partial w}{\partial \rho}$ evaluated at $\rho = 2$, $\theta = \pi$ and $\phi = \pi/2$.

(4) If $3x^2 z + y^3 - xyz^3 = 0$, find $\frac{\partial z}{\partial x}$.