Name _____

Homework 13
Section 14.6

1. (6) Find $\frac{\partial z}{\partial u}$ and $\frac{\partial z}{\partial v}$ for $z = x^2 + 2xy$, $x = \frac{u^2}{v}$, $y = 2u + v$.

2. (6) Let $T(x, y) = 4x^2 - 4xy + 5y^2$, $x = \cos t$, and $y = -\sin t$, $0 \leq t < 2\pi$. Compute $\frac{dT}{dt}$.

3. (8) If $w = f(x, y)$, where $x = r\cos\theta$ and $y = r\sin\theta$, show that

$$\left(\frac{\partial w}{\partial x}\right)^2 + \left(\frac{\partial w}{\partial y}\right)^2 = \left(\frac{\partial w}{\partial r}\right)^2 + \frac{1}{r^2}\left(\frac{\partial w}{\partial \theta}\right)^2$$