

Name: _____

Score: _____ /20

The Chain Rule

Please staple your work and use this page as a cover page.

1. Find dz/dt if $z = x^2 + y^2 + xy$, $x = \sin t$, and $y = e^t$.
2. Find dw/dt if $w = xe^{y/z}$, $x = t^2$, $y = 1 - t$, and $z = 1 + 2t$.
3. If $z = f(x, y)$ and f is differentiable with $x = g(t)$ and $y = h(t)$, use the following table of values to compute dz/dt at $t = 3$.

$$\begin{array}{lll} g(3) = 2 & g'(3) = 5 & f_x(2, 7) = 6 \\ h(3) = 7 & h'(3) = -4 & f_y(2, 7) = -8 \end{array}$$

4. Find $\partial w/\partial r$ and $\partial w/\partial \theta$ at $r = 2$ and $\theta = \pi/2$ if $w = xy + yz + zx$, $x = r \cos \theta$, $y = r \sin \theta$, and $z = r\theta$.