

Math 32 – Workshop #16

1. If $F(s, t) = f(x, y) = f(x(s, t), y(s, t))$, find an expression for $\frac{\partial F}{\partial s}$. List all possible first derivatives that can be found in this problem.
2. If $F(x, y, z) = f(t, u, w) = f(t(x, z), u(x, y), w(z))$, list all possible first derivatives that can be found in this problem. Find expressions for the first derivative of F with respect to x , the first derivative of F with respect to y , and the first derivative of F with respect to z .
3. If $F(t) = f(u, v)$ with $u = g(t)$ and $v = h(t)$, what function values do you need to know so that you can evaluate $F(2)$? To evaluate $\left. \frac{dF}{dt} \right|_{t=2}$?
4. If $F(t, s) = f(u, v)$ with $u = g(t, s)$ and $v = h(t, s)$, what function values do you need to know so that you can evaluate $F(2, 3)$? To evaluate $\left. \frac{\partial F}{\partial t} \right|_{(2,3)}$?
5. Suppose that f is a differentiable function of x and y and $g(r, s) = f(2r^2 - s^2, r + 3s)$. Calculate $g_r(2, 3)$ and $g_s(2, 3)$, given the values below.

	f	g	f_x	f_y
$(-1, 11)$	2	5	4	7
$(2, 3)$	-2	3	-1	6