Problem statement Suppose $f(t)$ is a differentiable function of one variable, and $f(1) = A$, $f'(1) = B$, and $f''(1) = C$. Define $F(x, y, z)$ with this equation: $F(x, y, z) = f(xz^2 - y^3)$.

a) Compute $F(1, 2, 3)$ in terms of the information supplied and any needed constants.

b) Compute $\dfrac{\partial F}{\partial x}(1, 2, 3)$ in terms of the information supplied and any needed constants.

c) Compute $\dfrac{\partial F}{\partial z}(1, 2, 3)$ in terms of the information supplied and any needed constants.

d) Compute $\dfrac{\partial^2 F}{\partial z^2}(1, 2, 3)$ in terms of the information supplied and any needed constants.

e) Compute $\dfrac{\partial^2 F}{\partial x \partial z}(1, 2, 3)$ in terms of the information supplied and any needed constants.