Let *f*: ℝ3 → ℝ be differentiable. Making the substitution

x = ρ cos(θ) sin(φ), y = ρ sin(θ) sin(φ), z = ρ cos(φ)

(spherical coordinates) into *f*:(x,y,z), compute
$\frac{∂f}{∂ρ},\frac{∂f}{∂θ}, and\frac{∂f}{∂φ} in terms of ∂f/∂x, \frac{∂f}{∂y, } and $ $\frac{∂f}{∂z }$ .