$w = x^4y^3z^2 + x^3y^2 + x^2z + y + 3$ at $(2,1,1)$

$$\frac{dw}{dt} = \frac{\partial w}{\partial x}\frac{dx}{dt} + \frac{\partial w}{\partial y}\frac{dy}{dt} + \frac{\partial w}{\partial z}\frac{dz}{dt}$$

$w_x = 4x^3y^3z^2 + 3x^2y^2 + 2xz$

$w_y = x^4 3y^2z^2 + x^3 2y + 1$

$w_z = x^4y^3 2z + x^2$

$w_x(2,1,1) = 32 + 12 + 4 = 48$

$w_y(2,1,1) = 48 + 16 + 1 = 65$

$w_z(2,1,1) = 32 + 4 = 36$

$$dw = 48dx + 65dy + 36dz$$