$$\frac{\partial z}{\partial s} = \frac{\partial z}{\partial x}\frac{\partial x}{\partial s} + \frac{\partial z}{\partial y}\frac{\partial y}{\partial s}$$ analogamente para t y u

a) $Z = x^4 + x^2 y$ $\quad x = s + 2t - u \quad y = stu^2$

$$\frac{\partial z}{\partial x} = \frac{\partial}{\partial x} x^4 + x^2 y = \frac{\partial}{\partial x} x^4 + \frac{\partial}{\partial x} x^2 y = 4x^3 + 2xy$$

$$\frac{\partial z}{\partial y} = \frac{\partial}{\partial y} x^4 + x^2 y = \frac{\partial}{\partial y} x^4 + \frac{\partial}{\partial y} x^2 y = x^2$$

$$\frac{\partial x}{\partial s} = \frac{\partial}{\partial s} s + 2t - u = \frac{\partial}{\partial s} s + \frac{\partial}{\partial s} 2t - \frac{\partial}{\partial s} u = 1$$

$$\frac{\partial y}{\partial s} = \frac{\partial}{\partial s} stu^2 = tu^2 \frac{\partial}{\partial s} s = tu^2$$

$$\frac{\partial x}{\partial t} = \frac{\partial}{\partial t} s + 2t - u = \frac{\partial}{\partial t} s + \frac{\partial}{\partial t} 2t - \frac{\partial}{\partial t} u = 2$$

$$\frac{\partial x}{\partial t} = \frac{\partial}{\partial t} stu^2 = su^2 \frac{\partial}{\partial t} t = su^2$$

$$\frac{\partial x}{\partial u} = \frac{\partial}{\partial u} s + 2t - u = \frac{\partial}{\partial u} s + \frac{\partial}{\partial u} 2t - \frac{\partial}{\partial u} u = -1$$

$$\frac{\partial y}{\partial u} = \frac{\partial}{\partial u} stu^2 = st \frac{\partial}{\partial u} u^2 = 2stu$$

$s = 4 \quad u = 1$

$x = 4 + 2(2) - 1 = 7 \qquad y = (4)(2)(1)^2 = 8 \qquad t = 2$

$$\frac{\partial z}{\partial s} = (4x^3 + 2xy)(1) + (x^2)(tu^2) = 4x^3 + 2xy + x^2 tu^2 \longrightarrow 1582$$

$$\frac{\partial z}{\partial t} = (4x^3 + 2xy)(2) + (x^2)(su^2) = 8x^3 + 4xy + x^2 su^2 \longrightarrow 3164$$

$$\frac{\partial z}{\partial u} = (4x^3 + 2xy)(-1) + (x^2)(2stu) = -4x^3 - 2xy + 2x^2 stu \longrightarrow -706$$