LECTURE 19: DIFFERENTIALS AND CONSTRAINED DIFFERENTIAL-

—(212-219 of 2020 LECTURES NOTES)—

$$xy^2z^3 = 1$$

$$\frac{\partial}{\partial x}(xy^2z^3)\,dx + \frac{\partial}{\partial y}(xy^2z^3)\,dy + \frac{\partial}{\partial z}(xy^2z^3)\,dz = 0$$

$$y^2z^3\,dx + 2xyz^3\,dy + 3xy^2z^2\,dz = 0$$

took the differential of

$$dz = \underbrace{\frac{-y^2z^3}{3xy^2z^2}}_{\left(\frac{\partial z}{\partial x}\right)_y}dx - \underbrace{\frac{2xyz^3}{3xy^2z^2}}_{\left(\frac{\partial z}{\partial y}\right)_x}dy$$

alert reader x & y are taken to be independent

$$dx = \underbrace{\frac{-2xyz^3}{y^2z^3}}_{\left(\frac{\partial x}{\partial y}\right)_z}dy - \underbrace{\frac{3xy^2z^2}{y^2z^3}}_{\left(\frac{\partial x}{\partial z}\right)_y}dz$$

← using y & z as independent

$$V_f = V_0 + at$$