

$$Z = (x+y)y$$

$$\frac{dz}{dt} = \left(\frac{d}{dt}(x+y) \right) y + (x+y) \frac{dy}{dt}$$

$$= \left(\frac{dx}{dt} + \frac{dy}{dt} \right) y + (x+y) \frac{dy}{dt}$$

$$= \left(y \frac{dx}{dt} + y \frac{dy}{dt} \right) + (x+y) \frac{dy}{dt}$$

$$= y \frac{dx}{dt} + (x+2y) \frac{dy}{dt}$$

$$dz = y dx + (x+2y) dy$$