

3.

$$w = xy - xz + yz, \quad x = t+2, \quad y = t-3, \quad z = t^2$$

$$\frac{dx}{dt} = 1 \quad \frac{dy}{dt} = 1 \quad \frac{dz}{dt} = 2t$$

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

$$= (y-z)(1) + (x+z)(1) + (-x+y)(2t)$$

$$= y-z + x+z - 2xt + 2yt$$

$$= x+y - 2xt + 2yt$$

$$\text{pluga in } x=t+2, y=t-3, z=t^2$$

$$= t+2 + t-3 - 2(t+2)t + 2(t-3)t$$

$$= 2t-1 - 2t(t+2) + 2t(t-3)$$

$$= 2t-1 - 2t^2 - 4t + 2t^2 - 6t$$

$$= \boxed{-8t-1}$$

$$b) w = xy - xz + yz$$

$$\text{pluga in } x=t+2, y=t-3, z=t^2$$

$$w = (t+2)(t-3) - (t+2)t^2 + (t-3)t^2$$

$$= t^2 - 3t + 2t - 6 - t^2(t+2) + t^3 - 3t^2$$

$$= t^2 - t - 6 - t^3 - 2t^2 + t^3 - 3t^2$$

$$w = -4t^2 - t - 6$$

$$\frac{dw}{dt} = \boxed{-8t-1}$$