

W6 Q1

$$\begin{aligned}\frac{\partial z}{\partial s} &= \frac{\partial z}{\partial x} \frac{\partial x}{\partial s} + \frac{\partial z}{\partial y} \frac{\partial y}{\partial s} \\ &= \frac{\partial z}{\partial x} e^s \cos t + \frac{\partial z}{\partial y} e^s \sin t\end{aligned}$$

$$\frac{\partial z}{\partial x} = \frac{\partial z}{\partial s} \frac{\partial s}{\partial x} + \frac{\partial z}{\partial t} \frac{\partial t}{\partial x}$$

$$\begin{aligned}\frac{\partial z}{\partial t} &= \frac{\partial z}{\partial x} \frac{\partial x}{\partial t} + \frac{\partial z}{\partial y} \frac{\partial y}{\partial t} \\ &= \frac{\partial z}{\partial x} (-e^s \sin t) + \frac{\partial z}{\partial y} (e^s \cos t)\end{aligned}$$