1) Given $z = x^2 + 2y^2$, find:

(a) $\left(\frac{\partial z}{\partial x}\right)_y$ (b) $\left(\frac{\partial z}{\partial x}\right)_\theta$ (c) $\left(\frac{\partial z}{\partial y}\right)_r$

(d) $\left(\frac{\partial z}{\partial \theta}\right)_x$ (e) $\left(\frac{\partial z}{\partial \theta}\right)_r$ (f) $\left(\frac{\partial z}{\partial r}\right)_x$

(g) $\frac{\partial^2 z}{\partial r \partial y}$ (h) $\frac{\partial^2 z}{\partial y \partial \theta}$ (i) $\frac{\partial^2 z}{\partial r \partial \theta}$

2) Given $z = (x+y)^5$ and $y = \sin 10x$, find $\frac{dz}{dx}$.

3) Given $c = \sin(a-b)$ and $b = ae^{2a}$, find $\frac{dc}{da}$.

4) Given $\begin{cases} 2t + e^x = s - \cos y - 2 \\ 2s - t = \sin y + x - 1 \end{cases}$, find $\left(\frac{\partial s}{\partial t}\right)_y$ at $(x,y,s,t) = \left(0, \frac{\pi}{2}, -1, -2\right)$.