

# PS 14 Selected Answers

$$\textcircled{1} \text{(b) (i)} \quad \frac{\partial z}{\partial x} = \frac{-(e^{xy} + xye^{xy} + ze^x)}{y + e^x}$$

$$\frac{\partial z}{\partial y} = \frac{-(x^2 e^{xy} + z)}{y + e^x}$$

$$\text{(ii)} \quad \frac{\partial z}{\partial x} = \frac{-(y^2 z e^{x+y} - yz \cos(xyz))}{y^2 e^{x+y} - xy \cos(xyz)}$$

$$\frac{\partial z}{\partial y} = \frac{-(2yz e^{x+y} + y^2 z e^{x+y} - xz \cos(xyz))}{y^2 e^{x+y} - xy \cos(xyz)}$$

$$\text{(iii)} \quad \frac{\partial z}{\partial x} = \frac{-(yz + \sin(x+y+z))}{xy + \sin(x+y+z)}$$

$$\frac{\partial z}{\partial y} = \frac{-(xz + \sin(x+y+z))}{xy + \sin(x+y+z)}$$

$$\text{(iv)} \quad \frac{\partial z}{\partial x} = \frac{-\left(\frac{1}{x+yz} - y^2 z^3\right)}{\frac{y}{x+yz} - 3xy^2 z^2}$$

$$\frac{\partial z}{\partial y} = \frac{-\left(\frac{z}{x+yz} - 2xyz^3\right)}{\frac{y}{x+yz} - 3xy^2 z^2}$$

③ (a)  $(t, 0), t \in \mathbb{R}$

(b)  $(0, 2)$

(c)  $(9/4, 3)$