13.3 #17

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

$$x\frac{\partial}{\partial x}\left(\cos(y^2+z^2)\right) + \cos(y^2+z^2)\frac{\partial}{\partial x}(x) = 3y\frac{\partial}{\partial x}(z)$$

$$x\left(-\sin(y^2+z^2)\frac{\partial}{\partial x}(y^2+z^2)\right) + \cos(y^2+z^2)(1) = 3y\frac{\partial z}{\partial x}$$

$$x\left(-\sin(y^2+z^2)(2z)\frac{\partial z}{\partial x}\right) + \cos(y^2+z^2) = 3y\frac{\partial z}{\partial x}$$

$$\cos(y^2+z^2) = 3y\frac{\partial z}{\partial x} + 2xz\sin(y^2+z^2)\frac{\partial z}{\partial x}$$

$$\text{So}\quad \frac{\partial z}{\partial x} = \frac{\cos(y^2+z^2)}{3y+2xz\sin(y^2+z^2)}$$

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

$$x\frac{\partial}{\partial y}\left(\cos(y^2+z^2)\right) = (3y)\frac{\partial}{\partial y}(z) + z\frac{\partial}{\partial y}(3y)$$

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

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

$$-3z - 2xy\sin(y^2+z^2) = 3y\frac{\partial z}{\partial y} + 2xz\sin(y^2+z^2)\frac{\partial z}{\partial y}$$

$$\frac{\partial z}{\partial y} = \frac{-3z - 2xy\sin(y^2+z^2)}{3y + 2xz\sin(y^2+z^2)}$$