$$X = \begin{bmatrix} \rho \cos (\phi) \\ \rho \sin (\phi) \end{bmatrix}$$

$$Y = \left[\begin{smallmatrix} \rho & \phi \end{smallmatrix} \right]$$

$$\frac{\partial X}{\partial Y} = \begin{bmatrix} \cos\left(\phi\right) & -\rho\sin\left(\phi\right) \\ \sin\left(\phi\right) & \rho\cos\left(\phi\right) \end{bmatrix}$$

$$\left| \frac{\partial X}{\partial Y} \right| = \rho$$

$$\left(\frac{\partial X}{\partial Y}\right)^{-1} = \begin{bmatrix} \cos\left(\phi\right) & \sin\left(\phi\right) \\ -\frac{\sin\left(\phi\right)}{\rho} & \frac{\cos\left(\phi\right)}{\rho} \end{bmatrix}$$