

$$\begin{aligned}y = x^{-2y} &\Leftrightarrow \ln y = -2y \ln x \Leftrightarrow \frac{dy}{y} = -2dy \ln x - \frac{2y dx}{x} \Leftrightarrow \\&\Leftrightarrow dy \left( \frac{1}{y} + 2 \ln x \right) = -2y \frac{dx}{x} \Rightarrow \frac{dy}{dx} = \frac{-2y}{x/y + 2x \ln x}\end{aligned}$$