

$$1.1 \quad y = (x^5)^{\ln x}$$

$$\begin{aligned}\ln y &= \ln x \ln x^5 \\ &= 5 \ln x \ln x \\ &= 5 (\ln x)^2\end{aligned}$$

$$\frac{1}{y} \frac{dy}{dx} = 5 \frac{d}{dx} (\ln x)^2$$

$$\frac{1}{y} \frac{dy}{dx} = 10 \ln x \cdot \frac{1}{x}$$

$$\frac{1}{y} \frac{dy}{dx} = \frac{10 \ln x}{x}$$

$$\frac{dy}{dx} = (x^5)^{\ln x} \left( \frac{10 \ln x}{x} \right)$$