

(9)

$$y = \ln(x^2)$$

$$\frac{dy}{dx} = \frac{1}{x^2} \cdot 2x = \frac{2}{x}$$

$$(8) \quad y = x^2 \ln x$$

$$\frac{dy}{dx} = 2x \ln x + \frac{x^2}{x} = 2x \ln x + x$$

$$(10) \quad y = e^{(\ln x)^2}$$

$$\frac{dy}{dx} = e^{(\ln x)^2} \cdot 2 \ln x \cdot \frac{1}{x}$$

$$(15) \quad y = \ln(\tan x)$$

$$y' = \frac{1}{\tan x} \cdot \sec^2 x = \cot x \sec^2 x$$

$$= \frac{\cos x}{\sin x} \cdot \frac{1}{\cos^2 x} = \frac{1}{\sin x \cos x}$$

$$= \csc x \sec x$$

$$(19) y = \log_2 x$$

$$y = \frac{\ln x}{\ln 2}$$

$$\frac{d}{dx} \left(\frac{\ln x}{\ln 2} \right) = \frac{1}{\ln 2} \frac{d}{dx} (\ln x) = \frac{1}{x \ln 2}$$