Logarithmic differentiation

3.12.1

(a)

$$y' = (x^4+1)^{5x} \cdot \left(5\ln(x^4+1) + \frac{20x^4}{x^4+1} \right)$$

(b)

$$y' = x^{\cos 3x} \left(\frac{\cos 3x}{x} - 3\sin 3x \cdot \ln x \right) + 7^{x^2} \cdot 2x \cdot \ln 7$$

(c)

$$y' = (\ln x)^{\ln x} \cdot \left(\frac{\ln \ln x}{x} + \frac{1}{x} \right)$$

(d)

$$y' = \frac{\sqrt[3]{x-\tan x}\,(1+2x^3)^5}{\sqrt{1+x^2}} \cdot \left(\frac{1}{3} \cdot \frac{1}{x-\tan x} \cdot \left(1 - \frac{1}{\cos^2 x}\right) + \frac{30x^2}{1+2x^3} - \frac{x}{1+x^2} \right)$$