
Complete the following problems. Show all work to receive full credit.

1. Compute the derivatives.

$$\begin{aligned} \text{(a)} \quad \frac{d}{dx} \left(x^7 + \sqrt{7} x - \frac{1}{\pi + 1} \right) \\ = 7x^6 + \sqrt{7} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad \frac{d}{dx} \left(\sqrt{2x \sec 3x} \right) \\ = \frac{1}{2} (2x \sec 3x)^{-\frac{1}{2}} (2 \sec 3x + 2x \sec 3x \tan 3x \cdot 3) \\ = \frac{1}{2} (2x \sec 3x)^{-\frac{1}{2}} (2 \sec 3x + 6x \sec 3x \tan 3x) \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad \frac{d}{dx} (\ln (\sin^{-1} x)) \\ = \frac{1}{\sin^{-1} x} \cdot \frac{1}{\sqrt{1-x^2}} = \frac{1}{\sin^{-1} x \sqrt{1-x^2}} \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad \frac{d}{dx} \left((1+x^2)e^{\tan^{-1} x} \right) \\ = 2xe^{\tan^{-1} x} + e^{\tan^{-1} x} \frac{1}{1+x^2} (1+x^2) \\ = 2xe^{\tan^{-1} x} + e^{\tan^{-1} x} \end{aligned}$$