

Solutions

Each answer shows the steps, then the **result**.

2.1

- $\frac{dy}{dx} = \frac{2x}{1+x^4}$

2.2

- $\frac{dy}{dx} = \ln x + 1$

3.1 A

- $\frac{1}{1+(3x)^2} \cdot 3 = \frac{3}{1+9x^2}$

3.2

- $\frac{dx}{dt} = -2 \sin t, \frac{dy}{dt} = 3 \cos t; \frac{dy}{dx} = \frac{3 \cos t}{-2 \sin t} = -\frac{3}{2} \cot t; \text{ at } t = \frac{\pi}{6}: -\frac{3}{2} \cot 30^\circ = -\frac{3}{2} \sqrt{3} = -\frac{3\sqrt{3}}{2}$

3.3

(a)

- $2xy + x^2 \frac{dy}{dx} + 3y^2 \frac{dy}{dx} = 0; \frac{dy}{dx} = -\frac{2xy}{x^2 + 3y^2}$

(b)

- at $(1, 2)$: $-\frac{2(1)(2)}{1+12} = -\frac{4}{13}$