

Solutions

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

2.1

- $\frac{d^2y}{dx^2} = \frac{\frac{d}{dt}(dy/dx)}{dx/dt}$

2.2

- $\frac{d}{dt}\left(\frac{3t}{2}\right) = \frac{3}{2}$

2.3

- $\frac{d^2y}{dx^2} = \frac{3/2}{2t} = \frac{3}{4t}$

3.1 B

- differentiate dy/dx w.r.t. t , then divide by dx/dt

3.2

(a)

- $\frac{dy}{dx} = \frac{3t^2 - 3}{1} = 3t^2 - 3$

(b)

- $\frac{d}{dt}(3t^2 - 3) = 6t$; divide by $dx/dt = 1$: $\frac{d^2y}{dx^2} = 6t$

(c)

- at $t = 1$, $6 > 0$: concave up

3.3

- $\frac{dy}{dx} = \frac{2t+1}{2t}$; $\frac{d}{dt}\left(\frac{2t+1}{2t}\right) = \frac{d}{dt}\left(1 + \frac{1}{2t}\right) = -\frac{1}{2t^2}$; divide by $2t$: $\frac{d^2y}{dx^2} = -\frac{1}{4t^3}$; at $t = 1$: $-\frac{1}{4}$