

5月23日 练习解答

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$$\begin{aligned} I(1) \left(\frac{x}{x^2+1} \right)' &= \frac{(x)'(x^2+1) - x(x^2+1)'}{(x^2+1)^2} \\ &= \frac{1 \cdot (x^2+1) - x \cdot 2x}{(x^2+1)^2} = \frac{1-x^2}{(x^2+1)^2} \end{aligned}$$

$$\begin{aligned} (2) \quad (t\sqrt{1+t^2})' &= (t)' \sqrt{1+t^2} + t (\sqrt{1+t^2})' \\ &= \sqrt{1+t^2} + t \cdot \frac{1}{2} \frac{1}{\sqrt{1+t^2}} \cdot 2t \\ &= \sqrt{1+t^2} + \frac{t^2}{\sqrt{1+t^2}} = \frac{2t^2+1}{\sqrt{1+t^2}} \end{aligned}$$

$$(3) \quad \{(1+t^2)^4\}' = 4(1+t^2) \cdot 2t = 8t(1+t^2)$$

$$\begin{aligned} (4) \quad \left\{ \frac{1}{(2t+1)^4} \right\}' &= -\frac{4}{(2t+1)^5} \cdot (2t+1)' \\ &= \frac{-8}{(2t+1)^5} \end{aligned}$$

$$\begin{aligned} (5) \quad \left(\frac{1}{\sqrt{1+t^2}} \right)' &= \frac{1}{2} \cdot \frac{1}{(1+t^2)\sqrt{1+t^2}} \cdot (1+t^2)' \\ &= \frac{t}{(1+t^2)\sqrt{1+t^2}} \end{aligned}$$

$$\begin{aligned} (6) \quad \left\{ \frac{1}{(1+t^2)^2} \right\}' &= -\frac{2}{(1+t^2)^3} \cdot (1+t^2)' \\ &= -\frac{4t}{(1+t^2)^3} \end{aligned}$$

II $y = \sqrt{x}(x-1)$

$$y' = (\sqrt{x})'(x-1) + \sqrt{x} \cdot (x-1)'$$

$$= \frac{1}{2\sqrt{x}}(x-1) + \sqrt{x} \cdot 1$$

$$= \frac{1}{2\sqrt{x}}(x-1) + 2\sqrt{x} \cdot \sqrt{x}$$

$$= \frac{3x-1}{2\sqrt{x}}$$

x	(0)		$\frac{1}{3}$	
y'		-	0	+
y		↘		↗

