


HW 2.6 :
CW 2.6 (CHAIN : TRIG RULES)

$$\cot^3 \sqrt{x}$$

$$\cot^3 x^3$$
$$\underbrace{(\cot x^3)^3}$$


$$\{ \cot^2 x^3 (\csc^2 x^3) \} x^2$$

$$\textcircled{18} \quad \frac{e^x}{\cos x} = y \quad = e^x \cdot \sec x$$

$$y' = \frac{\cos x \cdot e^x + e^x \sin x}{\cos^2 x}$$

$$= e^x \frac{\cos x + \sin x}{\cos^2 x}$$

$$= e^x (\sec x + \tan x \cdot \sec x)$$

$$= e^x \cdot \sec x (1 + \tan x)$$

$$\textcircled{19} \quad y = 5x^3 + 30x^2 - 75x + 19$$

$$y' = 15x^2 + 60x - 75$$

$$\therefore 0 = 15x^2 + 60x - 75$$

$$\therefore 0 = \cancel{15}(x^2 + 4x - 5)$$

$$\therefore 0 = (x + 5)(x - 1)$$

$$x = -5 \quad ; \quad x = 1$$

$$(16) \quad f(x) = \left(\frac{x+1}{3x+1} \right)^3$$

$$f' = 3 \left(\frac{x+1}{3x+1} \right)^2 \cdot \frac{(3x+1) - (x+1) \cdot 3}{(3x+1)^2}$$

$$= 3 \left(\frac{x+1}{3x+1} \right)^2 \frac{-2}{(3x+1)^2}$$

$$\textcircled{10} \quad y = \cos^2(3x) \sin(3x)$$

$$y' = \cos^2(3x) \cdot \cos(3x) \cdot 3 + \sin(3x) \cdot 2\cos(3x) \cdot (-\sin(3x) \cdot 3)$$

$$y' = 3\cos^3(3x) - 6\sin^2(3x)\cos(3x)$$

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$$y = \sin \sqrt[3]{3x}$$

$$y = \sin (3x)^{1/3}$$

$$y' = \cos (3x)^{1/3} \cdot \frac{1}{3} (3x)^{-2/3} \cdot 3$$

$$\textcircled{7} \quad y = \tan 8x + \cos \frac{1}{8}x$$

$$y' = \sec^2(8x) \cdot 8 + -\sin\left(\frac{1}{8}x\right) \cdot \frac{1}{8}$$

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HW 2.6

$$\# 247 \quad h(x) = \sqrt{x^2+1} = (x^2+1)^{1/2}$$

$$h'(x) = \frac{1}{2} (x^2+1)^{-1/2} \cdot 2x$$

$$= x(x^2+1)^{-1/2}$$

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

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

$$= \frac{-\cancel{x^2} + \cancel{x^2} + 1}{(x^2+1)^{3/2}}$$

$$(4) f(t) = \sin^2(e^{\sin^2 t}) = (\sin(e^{\sin^2 t}))^2$$

$$f'(t) = 2 \sin(e^{\sin^2 t}) \cdot \cos(e^{\sin^2 t}) e^{\sin^2 t} \cdot 2 \sin t \cdot \cos t$$