# Chain Rule--Day 2

Questions and More Examples

#14/27

$$y = \tan 3x$$

$$\frac{dy}{dx} = (\sec^2 3x)(3)$$

$$= 3\sec^2 3x$$

#27/29

$$f(x) = \frac{8}{\sqrt{4+3x}} \quad @\ (4,2)$$

$$= 8(4+3x)^{-1/2}$$

$$f'(x) = -4(4+3x)^{-3/2}(3)$$

$$= -\frac{12}{\sqrt{(4+3x)^3}}$$

$$f'(4) = -\frac{12}{64} = -\frac{3}{16} \longrightarrow m_T = -\frac{3}{16}$$

$$\therefore y - 2 = -\frac{3}{16}(x-4)$$

#29/30

$F(x) = f(g(x))$ and $g(3)=6$, $g'(3)=4$, $f'(3)=2$, $f'(6)=7$

find $F'(3)$.

$$F'(x) = f'(g(x))\,g'(x)$$

$$F'(3) = f'(g(3)) \cdot g'(3)$$

$$= f'(6) \cdot 4$$

$$= 7 \cdot 4$$

$$= 28$$

$$f(x) = \sqrt{1+\sqrt{1+\sqrt{x}}}$$

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

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

4.5 $y = \cos^3 \theta^2$

$$\frac{dy}{dx} = \left[3\cos^2 \theta^2\right]\left[-\sin \theta^2\right]\left[2\theta\right].$$

$$f(x) = \sin(\cos(\sin x))$$

$$f'(x) = [\cos(\cos(\sin x))][-\sin(\sin x)]\cos x$$

$$h(x) = 7 + x\tan 2\sqrt{x}$$

$$h'(x) = (x)(\sec^2 2\sqrt{x})\left(2\frac{1}{2\sqrt{x}}\right) + x\tan 2\sqrt{x}$$