

Product Rule

$$G) y = \frac{x^2}{\sqrt{1+x^3}}$$

$$y = \frac{x^2}{\sqrt{1+x^3}}$$

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

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

$$y' = x^2 \left[ \frac{-1}{2} (1+x^3)^{-3/2} \cdot 3x^2 \right] + (1+x^3)^{-1/2} \cdot 2x$$

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

$$G) y = \frac{x^2}{\sqrt{1+x^3}}$$

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

$$\frac{d}{dx} (1+x^3)^{1/2}$$

Quotient Rule

$$y' = (1+x^3)^{1/2} \cdot 2x - x^2 \left[ \frac{1}{2} (1+x^3)^{-1/2} \cdot 3x^2 \right]$$

$$\rightarrow y' = 2x\sqrt{1+x^3} - \frac{3x^4}{2} (1+x^3)^{-1/2}$$

Find  $\frac{dy}{dx}$   $y' =$

$$\frac{(2\sqrt{1+x^3}) \cdot 2x\sqrt{1+x^3}}{2\sqrt{1+x^3} \cdot 1} - \frac{3x^4}{2\sqrt{1+x^3}} = \frac{4x(1+x^3) - 3x^4}{2\sqrt{1+x^3}}$$

① Power Rule

②  $\frac{d}{dx}$  of the base

$$H) y = (5x + \sqrt[3]{x})^{-4}$$

$$y = (5x + \sqrt[3]{x})^{-4}$$

$$y = (5x + x^{1/3})^{-4}$$

$$\frac{dy}{dx} = -4(5x + x^{1/3})^{-5} \cdot \left( 5 + \frac{1}{3} x^{-2/3} \right)$$

$$\frac{x^4 + 4x}{2(1+x^3)^{3/2}}$$

$$\frac{x^4 + 4x}{2\sqrt{1+x^3} (1+x^3)}$$

$$y' = 15x^4(3x-6)^4 + 4x^3(3x-6)^5$$

1)  $y = x^4(3x-6)^5$

GCF  $\rightarrow x^3(3x-6)^4 [15x + 4(3x-6)]$

$$y = x^4(3x-6)^5$$

Product Rule

$$y' = x^4 \cdot \left[ 5(3x-6)^4 \cdot 3 \right] + (3x-6)^5 \cdot 4x^3$$

$\uparrow$   $\frac{d}{dx}(3x-6)^5$       $\uparrow$   $\frac{d}{dx}(3x-6)$       $\uparrow$   $\frac{d}{dx}(x^4)$

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

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

$$\frac{dy}{dx} = -3(1-2x)^{-4} \cdot (-2) = \frac{6}{(1-2x)^4}$$

$\boxed{6(1-2x)^{-4}} \leftarrow \boxed{\frac{6}{(1-2x)^4}}$