

2.2A Derivatives

$$A. \quad \text{IF } f(x) = x^{13} - 4x^{12} + 2x^{23} - 5$$

$$f'(x) = 13x^{12} - 48x^{11} + 46x^{22}$$

Power Rule - if $f(x) = x^n$

$$f'(x) = nx^{n-1}$$

$$2x^4 = 8x^3$$

$$2[4x^3]$$

$$f'(x) = x^3 + 5x^2 - 2x$$

$$f(x) = \frac{x^4}{4} + \frac{5x^3}{3} - \frac{2x^2}{2} + C$$

$$f(x) = x^{3/4} + x^{-4/7} - 2$$

$$f'(x) = \frac{3}{4}x^{-1/4} - \frac{4}{7}x^{-11/7}$$

$$\begin{aligned} f(x) &= \sqrt[5]{x^2} & \frac{d}{dx} \\ &= x^{2/5} = \frac{2}{5}x^{-3/5} \end{aligned}$$

$$10^{-3/5} = \frac{1}{10^{3/5}}$$

$$f'(x) = \frac{2}{3} x^{-4/3} + x^{4/7}$$

$$\begin{aligned} & \frac{\frac{2}{3} x^{-4/3}}{-1/3 \cdot 3/1} + \frac{x^{11/7} \cdot 7/11}{11/7 \cdot 7/11} \\ & -2x^{-1/3} + \frac{7}{11} x^{11/7} + C \end{aligned}$$

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

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

$$-\sin x$$

$$-\cos x$$

$$\sin x$$

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3-17 odd

D + AD

19-23 odd

31-51 odd

$$6. \quad x^8$$

$$D: 8x^7$$

$$AD: \frac{1}{9}x^9 + C$$

$$\frac{x^9}{9} + C$$