

27a. x^3 (2.8)

$$\lim_{\Delta x \rightarrow 0} \frac{(x+\Delta x)^3 - x^3}{\Delta x}$$

$$\lim_{\Delta x \rightarrow 0} (x+\Delta x)(x^2+2x\Delta x+\Delta x^2) - x^3$$

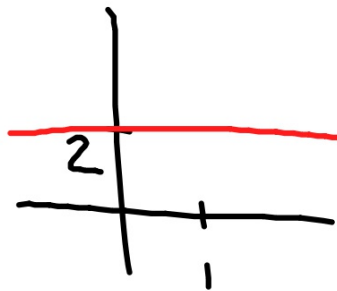
$$\lim_{\Delta x \rightarrow 0} \frac{x^3 + 2x^2\Delta x + x\Delta x^2 + x^2\Delta x + 2x\Delta x^2 + \Delta x^3 - x^3}{\Delta x}$$

$$\lim_{\Delta x \rightarrow 0} \frac{2x^2 + x\cancel{\Delta x} + x^2 + 2x\cancel{\Delta x} + \cancel{\Delta x^2}}{\Delta x}$$
$$3x^2$$

2.2A Basic Rules

A. Rules

1. Constant Rule: IF $f(x) = c$,
 $f'(x) = 0$



2. Power Rule - for $f(x) = x^n$
 $f'(x) = nx^{n-1}$

Ex. $f(x) = 6x^2$ $f'(x) = 12x'$

$$\text{Ex: } f(x) = 10x^4 \quad f'(x) = 40x^3$$

$$3. \text{ Sum/Diff : } \frac{d}{dx} [f(x) \pm g(x)] = f'(x) \pm g'(x)$$

$$\text{Ex. } f(x) = 4x^3 + 7x^2 - 2x + 5$$

$$f'(x) = 12x^2 + 14x - 2$$

Ex: $y = \frac{4}{x^3} = 4x^{-3} = -12x^{-4}$

$$5x^2 \rightarrow \frac{5}{x^2}$$

$$\text{Ex: } y = \sqrt[3]{x^2} = x^{2/3} = \frac{2}{3} x^{-1/3}$$

$$y = \sqrt[4]{x^1} = x^{1/4} = \frac{1}{4} x^{-3/4}$$

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

2.2 3-17 odd

31-36

39-43 odd