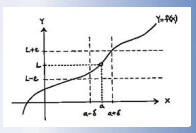
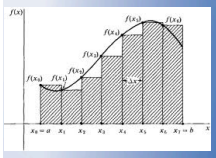


$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$\frac{d}{dx}\int_a^x f(t)\,dt = f(x)$$



$$\lim_{\max \Delta x_i \to 0} \sum_1^n f(x_i)\Delta x_i = \int_a^b f(x)dx$$

$$\int_a^b \mathrm{f}(x)\,dx = \mathrm{F}(b) - \mathrm{F}(a)$$

Rules For Finding Derivatives

$$\frac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}$$

$$= \frac{\mathrm{lo} \cdot \mathrm{d\ hi} - \mathrm{hi} \cdot \mathrm{d\ lo}}{\mathrm{lo} \cdot \mathrm{lo}}$$

Constant Function Rule

Identity Function Rule

Constant Multiple Rule

Sum & Difference Rule

10 Rules Derivatives

POWER RULE

n	$f(x)=x^n$	$f'(x)$	

EX 1 Find $f'(x)$ if $f(x) = 3x^7-4x^6+x^5+2x^3-x^2+4$

10 Rules Derivatives

Product Rule

If f and g are differentiable, then

$$D_x\left(f(x)g(x)\right) = f(x)D_x[g(x)] + D_x[f(x)]g(x) \quad .$$

EX 2 Find *f'(x)* if *f(x) = (2x³-4x+1)(3x+5).*

a) Use the product rule:

b) Multiply out and use the power rule to check:

Quotient Rule

Let f and g be differentiable functions, g(x) ≠ 0,

then $D_x \dfrac{f(x)}{g(x)} = \dfrac{g(x)D_x[f(x)] - f(x)D_x[g(x)]}{g^2(x)}$.

EX 3 Find f'(x) if $f(x) = \dfrac{2x^2 + 4x - 1}{3x - 2}$.

10 Rules Derivatives

Note:

EX 4 $y = \frac{-3}{x} + \frac{2}{x^4 - 7x}$ Find *y'(x)* $D_x\left(x^{-n}\right) = -nx^{-n-1}$ for *n*, a positive integer

EX 5 Find $f'(x)$ *if* $f(x) = \frac{5x-4}{x^2+1}$

EX 6 Find $D_x(y)$ *if* $y = 3x(x^3 - 2x + 1)$

EX 7 Find $\frac{dy}{dx}$ *if* $y = \frac{-3}{x^5} + \frac{2}{x}$

$$\frac{g(x)f'(x) - f\ (x)g'(x)}{\left(g(x)\right)^2}$$

$$= \frac{\text{lo} \cdot \text{d hi} - \text{hi} \cdot \text{d lo}}{\text{lo} \cdot \text{lo}}$$