

Al-Rasheed University Collage
Dept. of Medical Instrument Tech. Eng.
First Class / Mathematics

امثلة عن المشتقات

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$$\frac{d}{dx}(c) = 0 \quad (c \text{ is a constant})$$

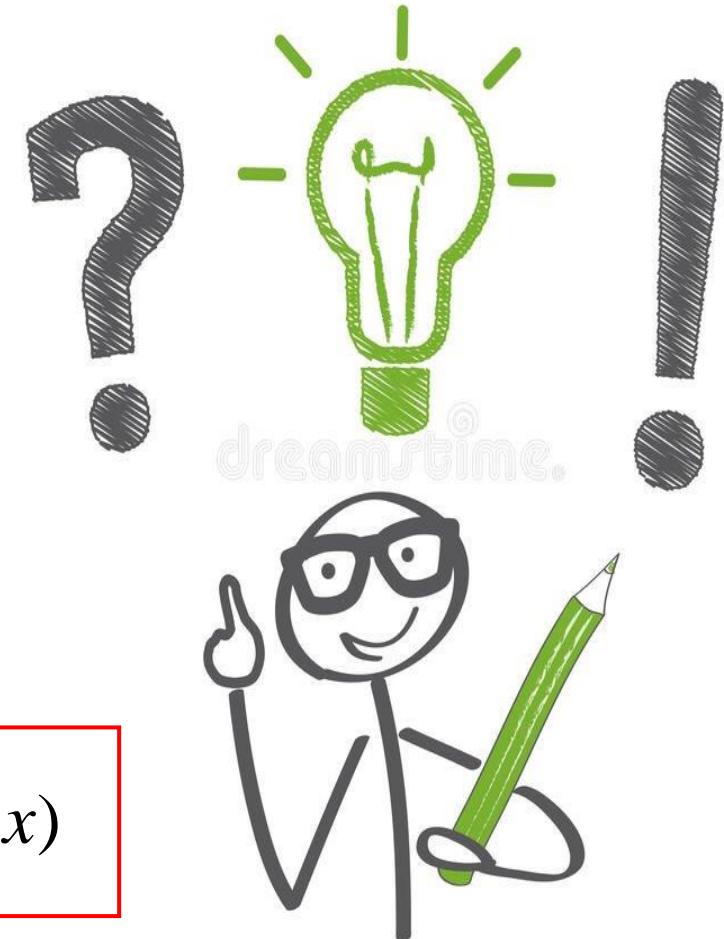
$$\frac{d}{dx}(x^n) = nx^{n-1} \quad (n \text{ is a real number})$$

$$\frac{d}{dx}(cf(x)) = c \frac{d}{dx}(f(x)) \quad (c \text{ is a constant})$$

$$\frac{d}{dx}[f(x) \pm g(x)] = \frac{d}{dx}[f(x)] \pm \frac{d}{dx}[g(x)]$$

$$\frac{d}{dx}[f(x) \cdot g(x)] = \frac{d}{dx}[f(x)]g(x) + \frac{d}{dx}[g(x)]f(x)$$

$$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x)\frac{d}{dx}[f(x)] - f(x)\frac{d}{dx}[g(x)]}{[g(x)]^2}$$





$$\frac{d}{dx} e^u = e^u \frac{du}{dx}$$

$$\frac{d}{dx} (a^u) = a^u \ln a \frac{du}{dx}$$

$$\frac{d}{dx} \ln u = \frac{1}{u} \frac{du}{dx}$$

$$\frac{d}{dx} \log_a u = \frac{1}{u \ln a} \frac{du}{dx}$$

$$\frac{d}{dx} (\sin x) = \cos x$$

$$\frac{d}{dx} (\cos x) = -\sin x$$

$$\frac{d}{dx} (\tan x) = \sec^2 x$$

$$\frac{d}{dx} (\csc x) = -\csc x \cot x$$

$$\frac{d}{dx} (\sec x) = \sec x \tan x$$

$$\frac{d}{dx} (\cot x) = -\csc^2 x$$

$$\frac{d}{dx} (\sinh x) = \cosh x$$

$$\frac{d}{dx} (\cosh x) = \sinh x$$

$$\frac{d}{dx} (\tanh x) = \operatorname{sech}^2 x$$

$$\frac{d}{dx} (\operatorname{csch} x) = -\operatorname{csch} x \coth x$$

$$\frac{d}{dx} (\operatorname{sech} x) = -\operatorname{sech} x \tanh x$$

$$\frac{d}{dx} (\coth x) = -\operatorname{csch}^2 x$$

$$f(x) = x^{0.5} + 0.5x + 0.5$$

$$f'(x) = 0.5x^{0.5-1} + 0.5*1*x^{(1-1)} + 0$$

$$= 0.5x^{-0.5} + 0.5$$

$$= \frac{1}{2x^{0.5}} + 0.5$$

$$= \frac{1}{2\sqrt{x}} + 0.5$$

$$\frac{d}{dx}[f(x) \pm g(x)] = \frac{d}{dx}[f(x)] \pm \frac{d}{dx}[g(x)]$$

$$\frac{d}{dx}(x^n) = nx^{n-1} \quad (n \text{ is a real number})$$

$$\frac{d}{dx}(c) = 0 \quad (c \text{ is a constant})$$



$$f(x) = \frac{\cos 2x}{2x}$$

$$\frac{d}{dx} \left[\frac{f(x)}{g(x)} \right] = \frac{g(x) \frac{d}{dx}[f(x)] - f(x) \frac{d}{dx}[g(x)]}{[g(x)]^2}$$

$$f'(x) = \frac{2x((-sin 2x) * 2) - [(\cos 2x) * 2]}{(2x)^2}$$

$$\frac{d}{dx}(\cos x) = -\sin x$$

$$f'(x) = \frac{-4x \sin 2x - 2 \cos 2x}{4x^2}$$

$$f'(x) = \frac{2(-2x \sin 2x - \cos 2x)}{4x^2}$$

$$f'(x) = \frac{(2x \sin 2x - \cos 2x)}{2x^2}$$



$$\frac{d}{dx} [f(x) \cdot g(x)] = \frac{d}{dx}[f(x)]g(x) + \frac{d}{dx}[g(x)]f(x)$$

$$f(x) = (e^{2x} + 5)(\ln 2x + 3)$$

مشتقة دالتين مضروبة = (مشتقة الأول * الثاني) + (مشتقة الثاني * الأول)

$$f'(x) = (e^{2x} * 2 + 0)(\ln 2x + 3) + \left(\frac{1}{2x} * 2 + 0\right) (e^{2x} + 5)$$

$$= (\ln 2x + 3) * (2e^{2x}) + (e^{2x} + 5) * \left(\frac{1}{x}\right)$$

$$= \left(2e^{2x} \ln 2x + 6e^{2x}\right) + \left(\frac{e^{2x}}{x} + \frac{5}{x}\right)$$

$$\frac{d}{dx} \ln u = \frac{1}{u} \frac{du}{dx}$$

$$\frac{d}{dx} e^u = e^u \frac{du}{dx}$$



$$f(x) = \frac{\log}{10} 5x$$

$$\frac{d}{dx} \log_a u = \frac{1}{u \ln a} \frac{du}{dx}$$

$$f'(x) = \frac{1}{5x * \ln 10} * 5$$

$$= \frac{1}{x * \ln 10}$$



$$\frac{d}{dx} [f(x) \cdot g(x)] = \frac{d}{dx}[f(x)]g(x) + \frac{d}{dx}[g(x)]f(x)$$

$$f(x) = \cos 3x \cdot \sec 2x + \sin x^2 \cdot \cot 3x$$

$$f'(x) = \{-\sin 3x \cdot (3) \cdot \sec 2x + [\sec 2x \cdot \tan 2x \cdot (2)] \cdot \cos 3x\}$$

$$+ \{[\cos x^2 \cdot (2x)] \cdot \cot 3x + [-\csc^2 3x \cdot (3)] \cdot \sin x^2\}$$

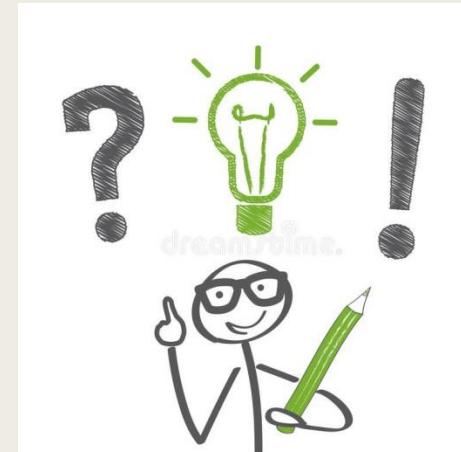
$$\frac{d}{dx}(\cos x) = -\sin x$$

$$\frac{d}{dx}(\sec x) = \sec x \tan x$$

$$\frac{d}{dx}(\sin x) = \cos x$$

$$= \{-3\sin 3x \cdot \sec 2x + 2\sec 2x \cdot \tan 2x \cos 3x\}$$

$$+ \{2x \cos x^2 \cdot \cot 3x - 3\csc 3x \cdot \sin x^2\}$$



$$\frac{d}{dx}(\cot x) = -\csc^2 x$$