Derivadas de las Funciones Seno y Coseno

$$\frac{d}{dx}(\text{sen } x) = \cos x \qquad \frac{d}{dx}(\cos x) = -\text{sen } x$$

La derivada de una constante se hace cero

Ejemplos:

1. $y = 2 \text{ sen } x$

$$\frac{d}{dx} = 2\frac{d}{dx}[\text{sen } x] + \text{sen } x \frac{d}{dx}[2]$$

$$y' = 2 \cos x$$

2. $y = \frac{\text{sen } x}{2}$

$$\frac{d}{dx} = \frac{1}{2}\frac{d}{dx}[\text{sen } x] + \text{sen } x \frac{d}{dx}\left[\frac{1}{2}\right]$$

$$y' = \frac{1}{2}\cos x + 0 = \frac{\cos x}{2}$$

3. $y = x + \cos x$

$$\frac{d}{dx} = \frac{d}{dx}[x] + \frac{d}{dx}[\cos x]$$

$$y' = 1 - \text{sen } x$$

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4. $y = \frac{\pi}{2} \operatorname{sen}\theta - \cos\theta$

$$\frac{d}{dx} = \frac{\pi}{2}\frac{d}{dx}[\operatorname{sen}\theta] + \operatorname{sen}\theta\frac{d}{dx}\left[\frac{\pi}{2}\right] - \frac{d}{dx}[\cos\theta]$$

$$y' = \frac{\pi}{2}\cos\theta + 0 - (-\operatorname{sen}\theta)$$

$$= \frac{\pi}{2}\cos\theta + \operatorname{sen}\theta$$

5. $y = x^2 - \frac{1}{2}\cos x$

$$\frac{d}{dx} = \frac{d}{dx}[x^2] - \left(\frac{1}{2}\frac{d}{dx}[\cos x] + \cos x\frac{d}{dx}\left[\frac{1}{2}\right]\right)$$

$$= 2x + \frac{1}{2}\operatorname{sen} x$$

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6. $y = \frac{1}{x} - 3 \operatorname{sen} x$

$$\frac{d}{dx} = \frac{d}{dx}[1x^{-1}] - \left(3\frac{d}{dx}[\operatorname{sen} x] + \operatorname{sen} x \frac{d}{dx}[3]\right)$$

$$= -1x^{-2} - 3\cos x + 0$$

$$= -\frac{1}{x^2} - 3\cos x$$

7. $y = 3x^2 \operatorname{sen} x$

$$\frac{d}{dx} = 3x^2 \frac{d}{dx}[\operatorname{sen} x] + \operatorname{sen} x \frac{d}{dx}[3x^2]$$

$$= 3x^2 \cos x + 6x \operatorname{sen} x$$

$$= 3x(x\cos x + 2\operatorname{sen} x)$$

$$y = 2x\cos x - 2\operatorname{sen} x$$

$$\frac{d}{dx} = 2x\frac{d}{dx}[\cos x] + \cos x \frac{d}{dx}[2x] - \left(2\frac{d}{dx}[\operatorname{sen} x] + \operatorname{sen} x \frac{d}{dx}[2]\right)$$

$$= -2x \operatorname{sen} x + 2\cos x - 2\cos x$$

$$= -2x \operatorname{sen} x$$

Derivadas de las Funciones Seno y Coseno

DERIVADAS DE OTRAS FUNCIONES TRIGONOMÉTRICAS

$$\frac{d}{dx}[\tan x] = \sec^2 x \qquad \frac{d}{dx}[\cot x] = -\csc^2 x$$

$$\frac{d}{dx}[\sec x] = \sec x \tan x \qquad \frac{d}{dx}[\csc x] = -\csc x \cot x$$

Ejemplos:

1. $y = x - \tan x$

$$\frac{dy}{dx} = 1 - \sec^2 x$$

2. $y = x \sec x$

$$y' = x\frac{d}{dx}[\sec x] + \sec x \frac{d}{dx}[x]$$

$$y' = x \sec x \tan x + (1)\sec x$$

$$y' = (\sec x)(1 + x \tan x)$$

3. $y = \dfrac{1 - \cos x}{\operatorname{sen} x}$

$$y' = \frac{(\operatorname{sen} x)\frac{d}{dx}[1 - \cos x] - (1 - \cos x)\frac{d}{dx}[\operatorname{sen} x]}{\operatorname{sen}^2 x}$$

Derivadas de las Funciones Seno y Coseno

$$y' = \frac{(\text{sen } x)[\text{sen } x] - (1 - \cos x)[\cos x]}{\text{sen}^2 x}$$

Por identidad: $sen^2 x + cos^2 x = 1$

$$y' = \frac{\text{sen}^2 x - \cos x + \cos^2 x}{\text{sen}^2 x}$$

$$= \frac{1 - \cos x}{\text{sen}^2 x}$$

4. $g(t) = \sqrt[4]{t} + 8 \sec t$

$$g'(t) = t^{1/4} + \left(8\frac{d}{dx}[\sec t] + \sec t \frac{d}{dx}[8]\right)$$

$$= \frac{1}{4}t^{-3/4} + 8 \sec t \tan t$$

$$\frac{1}{4t^{3/4}} + 8 \sec t \tan t$$