

$f(x) = \tan x$ ¿cuánto vale la derivada?

$$f(x) = \tan x$$

$$f'(x) = (\tan x)' = \left(\frac{\operatorname{sen} x}{\operatorname{cos} x} \right)' = \frac{(\operatorname{sen} x)' (\operatorname{cos} x) - (\operatorname{sen} x) (\operatorname{cos} x)'}{(\operatorname{cos} x)^2}$$

$$= \frac{(\operatorname{cos} x)(\operatorname{cos} x) - (\operatorname{sen} x)(-\operatorname{sen} x)}{(\operatorname{cos} x)^2} = \frac{(\operatorname{cos} x)^2 + \operatorname{sen}^2 x}{(\operatorname{cos} x)^2}$$

$$= \frac{1}{(\operatorname{cos} x)^2} = \sec^2 x$$

$$f(x) = \operatorname{cot} x = \left(\frac{\operatorname{cos} x}{\operatorname{sen} x} \right)' = \frac{(\operatorname{cos} x)' \operatorname{sen} x - (\operatorname{cos} x) (\operatorname{sen} x)'}{(\operatorname{sen} x)^2}$$

$$= \frac{-\operatorname{sen} x \cdot \operatorname{sen} x - \operatorname{cos} x \operatorname{cos} x}{(\operatorname{sen} x)^2} = \frac{-(\operatorname{sen}^2 x + \operatorname{cos}^2 x)}{(\operatorname{sen} x)^2}$$

$$= \frac{-(1)}{(\operatorname{sen} x)^2} = -\frac{1}{(\operatorname{sen} x)^2} = -\operatorname{csc}^2 x$$

$f(x) = \sec x$ ¿Cuánto vale la derivada?

$$(f(x))' = (\sec x)' = \left(\frac{1}{\cos x} \right)' = \frac{(1)' \cos x - 1 \cdot (\cos x)'}{(\cos x)^2}$$

$$= \frac{0 - 1(-\sin x)}{(\cos x)^2} = \frac{+\sin x}{(\cos x) \cdot \cos x}$$

$$= \left(\frac{\sin x}{\cos x} \right) \cdot \frac{1}{\cos x} = \tan x \cdot \sec x$$

$f(x) = \csc x$ ¿Cuánto vale la derivada?

$$(f(x))' = (\csc(x))' = \left(\frac{1}{\sin x} \right)' = \frac{(1)'(\sin x) - (1)(\sin x)'}{(\sin x)^2}$$

$$= \frac{0 - \cos x}{(\sin x)^2} = - \frac{\cos x}{\sin x} \cdot \frac{1}{\sin x} =$$

$$= -\cot x \cdot \csc x$$