We know

- (sin x)' cosx

- (cos x)' = -sinx

- (sec x)' = secxtanx

$$f(x) = \tan x = \frac{\sin x}{\cos x}$$

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

$$= \sec^2 x$$

$$\cot x' = -\csc^2 x$$
$$\sec x' = \sec x \tan x$$
$$\csc x' = -\csc x \cot x$$