Derivatives of the Trigonometric Functions

$$D_x \left[\sin x \right] = \cos x$$

$$D_x \left[\cos x \right] = - \sin x$$

$$D_x \left[\tan x \right] = \sec^2 x$$

$$D_x \left[\cot x \right] = - \csc^2 x$$

$$D_x \left[\sec x \right] = \sec x \tan x$$

$$D_x \left[\csc x \right] = - \csc x \cot x$$

$f(x) = 3 \sin x$

$f'(x) = 3 \cos x$

$g'(x) = \tan x + \cot x$

$g'(x) = \sec^2 x - \csc^2 x$

$h(x) = x^2 \tan x$

$h'(x) = (x^2) \sec^2 x + (\tan x) 2x$

$\qquad = x^2 \sec^2 x + 2x \tan x$

$\tan x \, 2x$

$\tan x \, (2x)$

$(\tan x) 2x$

$2x \tan x$

$$f(x) = x \sin x + \cos x$$

$$f'(x) = x \cos x + \sin x - \sin x$$

$$= x \cos x$$

$$g(x) = 3 \sec x \tan x$$

$$g'(x) = 3 \left[\sec x \sec^2 x + \tan x \sec x \tan x \right]$$

$$= 3 \left[\sec^3 x + \sec x \tan^2 x \right]$$