Derivatives of the Trigonometric Functions

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

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

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

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

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

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

$f(x) = 3\sin x$

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

$h(x) = \tan x + \cot x$

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

$g(x) = x^3 \cos x$

$g'(x) = -x^3 \sin x + 3x^2 \cos x$

$g'(x) = (x^3)(-\sin x) + (\cos x)(3x^2)$

$5x^3$

$3 \cdot 5x^2$

$(\cos x)3x^2$

$3x^2 \cos x$

$$f(x) = 5 \sec x \tan x$$

$$f'(x) = 5\left[\sec x \sec^2 x + \tan x \sec x \tan x\right]$$

$$= 5\left[\sec^3 x + \sec x \tan^2 x\right]$$

$$h(x) = \frac{2\cos x}{1+x^2}$$

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