FUN	AP CALCULUS	
1	**Topic: 2.10**	**Finding the Derivatives of Tangent, Cotangent, Secant and Cosecant Functions**

Learning Objective FUN-3.B: Calculate derivatives of products and quotients of differentiable functions.

Recall the derivatives of $\sin(x)$ and $\cos(x)$ that you previously learned.

$$\frac{d}{dx}[\sin x] = \cos x \qquad \frac{d}{dx}[\cos x] = -\sin x$$

In addition to those, you will have to be very familiar with the derivatives of the other four trigonometric functions. They are provided in the box below.

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

ACTIVITY   Proof that $\frac{d}{dx}[\tan x] = \sec^2 x$.

Example 1:   Find the derivative of each.

a. $y = x - \tan x$

b. $y = x \sec x$

c. $y = \csc x - \cot x$. Prove $\dfrac{dy}{dx} = \dfrac{1}{1+\cos x}$