3.3 Derivatives of the Trig functions

First, recall the trig functions:

1. $\tan x = \dfrac{\sin x}{\cos x}$ $\qquad\qquad$ $\sec x = \dfrac{1}{\cos x}$

2. $\cot x = \dfrac{\cos x}{\sin x}$ $\qquad\qquad$ $\csc x = \dfrac{1}{\sin x}$

3. $\sin^2 x + \cos^2 x = 1$

And their derivatives are:

1. $(\sin x)' = \cos x$ $\qquad\qquad$ $(\sec x)' = \sec x \cdot \tan x$

2. $(\cos x)' = -\sin x$ $\qquad\qquad$ $(\csc x)' = -\csc x \cdot \cot x$

3. $(\tan x)' = \sec^2 x$ $\qquad\qquad$ $(\cot x)' = -\csc^2 x$

4. $\lim\limits_{x\to 0} \dfrac{\sin x}{x} = 1$ (squeeze theorem)

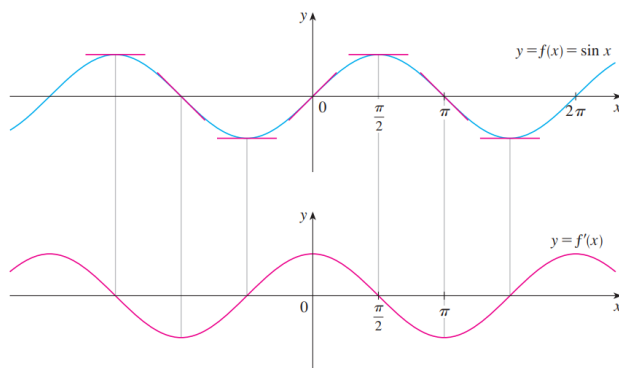5. $\lim\limits_{x\to 0} \dfrac{\cos x - 1}{x} = 0$ (multiply by $\dfrac{\cos x + 1}{\cos x + 1}$)

Figure 1: Sine and its derivative, cosine