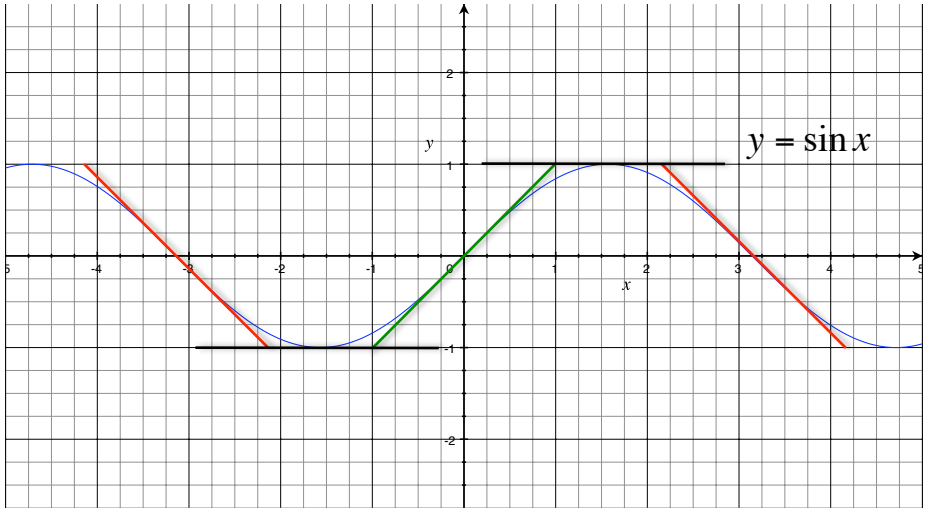
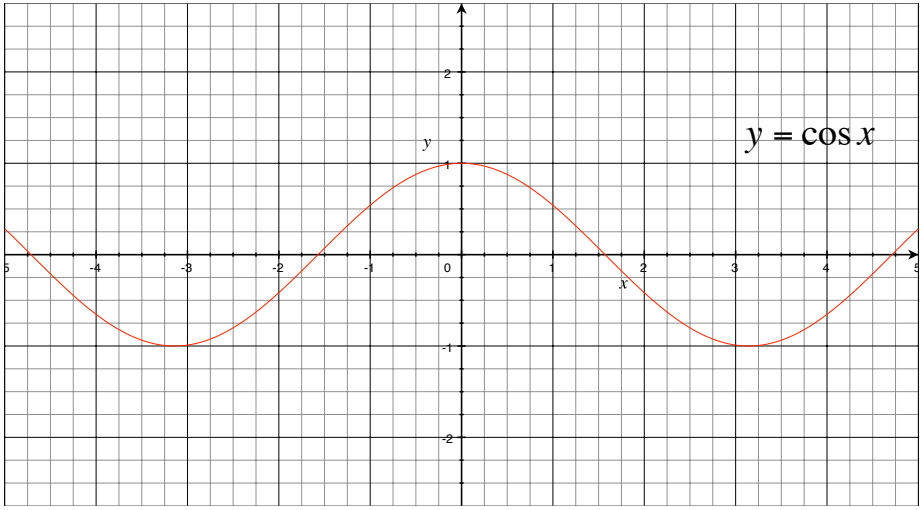
Derivatives of Trigonometric Functions





Derivatives of Trigonometric Functions

$$(\sin x)' = \cos x \qquad (\cos x)' = -\sin x \qquad (\tan x)' = \sec^2 x$$

Example:
Find the derivative of each.

(a) $f(x) = \cos(e^{3x^2})$ (b) $g(x) = \csc x$

(c) $h(x) = \tan x^4 + \tan^4 x$

Derivatives of Inverse Trig Functions

$$\frac{d}{dx}(\arcsin x) = \frac{1}{\sqrt{1-x^2}} \qquad \frac{d}{dx}(\arctan x) = \frac{1}{1+x^2}$$

Example 1:

Differentiate.

(a) $f(x) = \arctan\left(x/5\right) + \arctan\left(5/x\right)$

(b) $g(x) = \ln(\arcsin(5x^3 + 1))$

Example 2:

Prove $\frac{d}{dx}(\arctan x) = \frac{1}{1+x^2}$.