

Section 3.4: Derivatives of Trigonometric Functions

These notes reflect material from our text, *Calculus, Concepts and Contexts, Third Edition*, by James Stewart, published by Brooks/Cole, Pacific Grove, CA, 2005.

Key points from Stewart, Section 3.4: Derivatives of sin, cos and tan.

The Derivative

Recall that if $f(x)$ is a function, the *derivative at $x = a$* is given by

$$f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$

provided that this limit exists.

The Derivatives of the Trigonometric Functions

Sine Function

$$\frac{d}{dx}(\sin x) = \cos x$$

Cosine Function

$$\frac{d}{dx}(\cos x) = -\sin x$$

Tangent Function

$$\frac{d}{dx}(\tan x) = \sec^2 x$$

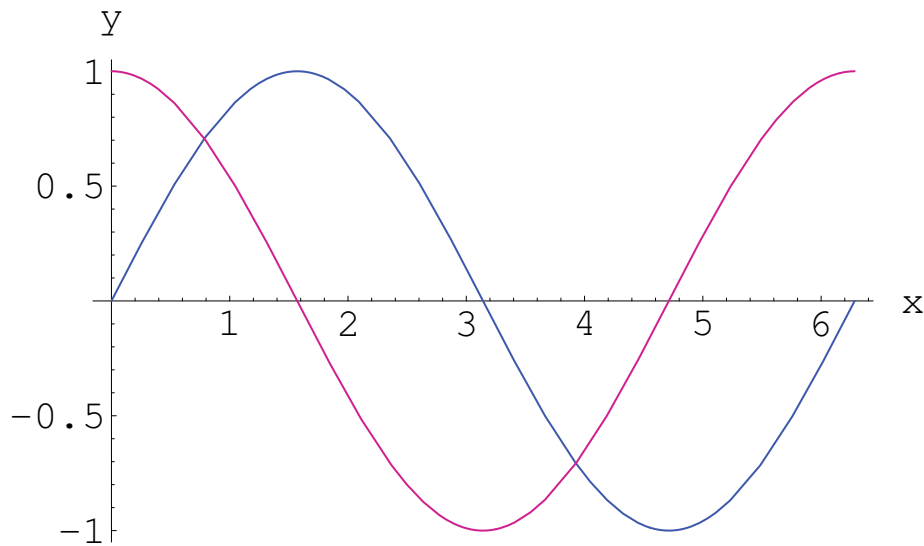


Fig. $\sin' = \cos$.

Exercises

Exercises for Section 3.4, pp 218–220: 3, 7, 18, 23, 29, 31 (spring), 33 (ladder), 37 (differential equation)