

Derivatives of trigonometric functions

3.9.1

Find  $\frac{dy}{dx}$  (do not simplify your answer):

(a)

$$y = \sec x \cdot \cos x^3$$

(b)

$$y \tan x^2 = x \tan y^2$$

3.9.2

Find  $f'(1)$  if  $f(1) = 0$  and  $f(x) + x \cos(f(x)) = x^2$ .

3.9.3

Find  $f^{(21)}(x)$  if  $f(x) = \sin(2x)$ .

3.9.4

Use the fact that  $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$  to find the following limits:

(a)  $\lim_{x \rightarrow 0} \frac{\tan(6x)}{\sin(2x)}$

(b)  $\lim_{x \rightarrow 1} \frac{x^2 + x - 2}{\sin(x - 1)}$