Exercise 27

(a) If $f(x) = \sec x - x$, find $f'(x)$.

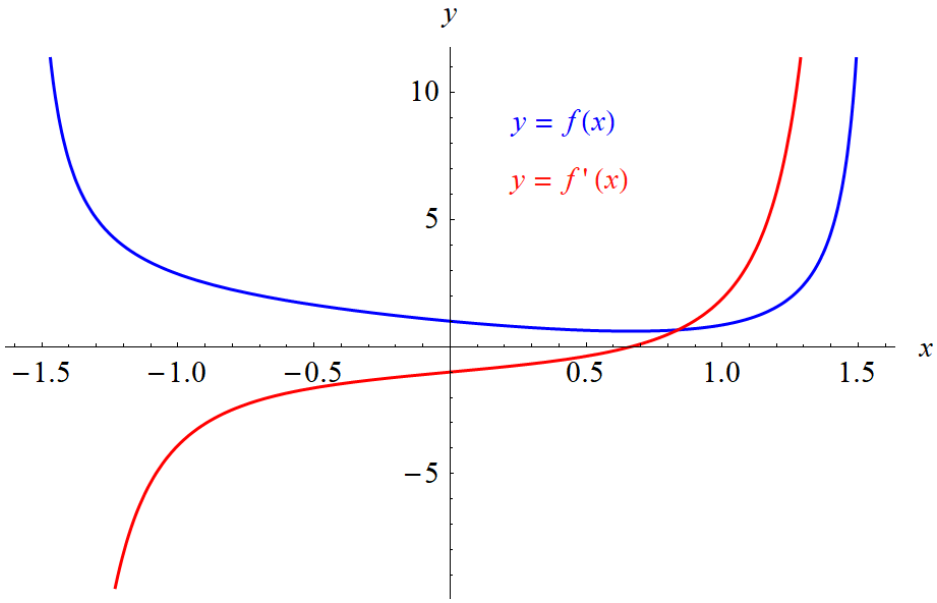
(b) Check to see that your answer to part (a) is reasonable by graphing both f and f' for $|x| < \pi/2$.

Solution

Calculate the derivative of the given function

$$\begin{aligned} y' &= \frac{d}{dx}(\sec x - x) \\ &= \frac{d}{dx}(\sec x) - \frac{d}{dx}(x) \\ &= (\sec x \tan x) - (1) \\ &= \sec x \tan x - 1 \end{aligned}$$

The function and its derivative are plotted below versus x.



The answer in part (a) is reasonable because the graph of $y = f'(x)$ is negative (positive) wherever $y = f(x)$ is decreasing (increasing).