

Worksheet 4: More Derivatives

18.01 Fall 2009

Problem 1. Compute the following derivatives:

a) $\sin(1/(4x + 2))$

b) $\sec^2(x + \sec x)$

c) $\tan \sin x$

Problem 2. Suppose $f(3) = 3$, $f'(3) = 5$, $g(3) = 4$, $g'(3) = 5$.

What is $(f^2(x)g(x))'|_{x=3}$?

Problem 3. a) Determine the tangent line to the unit circle at $\theta = \pi/6$, measured from the positive x -axis. First compute the slope by implicit differentiation, and then sanity-check your answer using trigonometry.

b) What is dy/dx on the curve $x^{3/2} + y^{5/2} = 1$ at the point $(2^{-2/3}, 2^{-2/5})$?

Problem 4. Find the derivative of $\arctan(x)$ (a.k.a. $\tan^{-1}(x)$)

Problem 5. $d^{97}(\sin x)/dx^{97} = ?$