

Math 113 – Homework 6 – Solutions

Due: 15 December 2005 Thursday.

Find the derivatives of the given functions with respect to x and write your answers in the spaces provided. Do not simplify. Leave your answer in a format which is easy to read.

1	$f(x) = x^x$	$f'(x) = x^x(\ln x + 1)$
2	$f(x) = (\ln x)^{\ln x}$	$f'(x) = (\ln x)^{\ln x} \left(\frac{1}{x} \ln \ln x + \ln x \frac{1}{\ln x} \frac{1}{x} \right)$
3	$f(x) = x^{\cos x}$	$f'(x) = x^{\cos x} \left(-\sin x \ln x + \cos x \frac{1}{x} \right)$
4	$f(x) = \int_{\sec x}^{\tan x} \sqrt{1+t^3} dt$	$f'(x) = \sqrt{1+\tan^3 x} \sec^2 x - \sqrt{1+\sec^3 x} \sec x \tan x$
5	$f(x) = \sec x + \ln \tan x$	$f'(x) = \sec x \tan x + \frac{1}{\tan x} \sec^2 x$
6	$f(x) = x \sin \frac{1}{x}$	$f'(x) = \sin \frac{1}{x} + x \cos \frac{1}{x} \frac{-1}{x^2}$
7	$f(x) = \frac{x^2 + 1}{x^3 + 1}$	$f'(x) = \frac{2x(x^3 + 1) - (x^2 + 1)(3x^2)}{(x^3 + 1)^2}$
8	$f(x) = (\cos x)(\ln x)$	$f'(x) = -\sin x \ln x + \cos x \frac{1}{x}$
9	$f(x) = (\cos x)^2 \ln x$	$f'(x) = 2(\cos x)(-\sin x) \ln x + (\cos x)^2 \frac{1}{x}$
10	$f(x) = (\cos x)^2 (\ln x)^3$	$f'(x) = 2(\cos x)(-\sin x)(\ln x)^3 + (\cos x)^2 3(\ln x)^2 \frac{1}{x}$

Comments and questions to sertoz@bilkent.edu.tr