MATH 100 – WORKSHEET 6
POLYNOMIALS AND EXPONENTIALS

1. Direct problems

Fact. $(fg)' = f'g + fg'$, $\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$. $\frac{\mathrm{d}}{\mathrm{d}x}x^a = ax^{a-1}$. $\frac{\mathrm{d}}{\mathrm{d}x}e^x = e^x$.

(1) Differentiate

(a) $f(x) = 6x^\pi + 2x^e - x^{7/2}$. $f'(x) =$

(b) $f(x) = \frac{\sqrt{x}(1-3x)}{x^2+1}$. $f'(x) =$

(c) $f(x) = \frac{x^2+xe^x}{\cos x + \sin x}$. $f'(x) =$

Date: 29/9/2015, Worksheet by Lior Silberman.

2. Derivatives, limits, and slopes

(1) Simplify $\left(e^5\right)^3$, $\left(2^{1/3}\right)^{12}$, 7^{3-5}.

(2) What is $\lim_{h\to 0} \frac{7^h-1}{h}$? This is the derivative of ...

(3) What is the equation of the line tangent the graph $y = 3e^x + x$ at the point where $x = -1$?

(4) Let $f(x) = \frac{g(x)}{x}$, where $g(x)$ is differentiable near $x = 1$. The line $y = 2x - 1$ is tangent to the graph $y = f(x)$ at $x = 1$. Find $g(1)$ and $g'(1)$.