

Math 21B
Kouba
Discussion Sheet 1

1.) Differentiate the following functions.

a.) $y = 20x^5$ b.) $f(x) = \sin 7x$ c.) $g(x) = \tan \sqrt{x}$

d.) $g(x) = \sec(x^4)$ e.) $f(x) = 3^{4x+7}$ f.) $y = \ln(x - e^x)$

g.) $y = e^{x^2-2x}$ h.) $f(x) = 2^{\tan(\ln x)}$ i.) $f(x) = x^2 e^x$

j.) $f(x) = \ln |\sec x + \tan x|$

2.) Use your answers in problem 1.) to compute the following indefinite integrals.

a.) $\int 100x^4 dx$ b.) $\int 7 \cos 7x dx$ c.) $\int \frac{\sec^2 \sqrt{x}}{\sqrt{x}} dx$

d.) $\int x^3 \sec(x^4) \tan(x^4) dx$ e.) $\int 3^{4x+7} \ln 3 dx$ f.) $\int \frac{1 - e^x}{x - e^x} dx$

g.) $\int (x - 1)e^{x^2-2x} dx$ h.) $\int \frac{2^{\tan(\ln x)} \sec^2(\ln x)}{x} dx$ i.) $\int (x^2 + 2x)e^x dx$

j.) $\int \sec x dx$

3.) Compute the following indefinite integrals WITHOUT using u-substitution. Think of using derivative rules (e.g., chain rule) backwards.

a.) $\int (4x^3 - x^{-2}) dx$ b.) $\int \sin 3x dx$ c.) $\int x \sec^2(x^2) dx$

d.) $\int (7^x + x^7) dx$ e.) $\int (e^{4x+3} + 4^{e^x}) dx$ f.) $\int x(x - 1)^2 dx$ g.) $\int \frac{1}{x} dx$

h.) $\int \frac{2x}{x^2 + 1} dx$ i.) $\int \frac{\cos 3x}{1 + \sin 3x} dx$ j.) $\int \frac{x + e^{2x}}{x^2 + e^{2x}} dx$

THE FOLLOWING PROBLEM IS FOR RECREATIONAL PURPOSES ONLY.

4.) Write a formula for the nth term in the following sequence : 2, 0, 0, 2, 6, 12, 20, 30, ...