

Math 21B
Kouba
Discussion Sheet 3

1.) Determine the following indefinite integrals (antiderivatives).

a.) $\int x(x^2 + 1)^5 dx$ b.) $\int e^x \cos(e^x) dx$ c.) $\int \cos x e^{2+\sin x} dx$
d.) $\int \frac{x^2 + 1}{x^3} dx$ e.) $\int \frac{x^2 + 1}{x + 3} dx$ f.) $\int \frac{x^2}{x^3 + 1} dx$ g.) $\int 7^{3x+5} dx$
h.) $\int \frac{1}{\sqrt{1-x^2}} dx$ i.) $\int \frac{e^x}{\sqrt{1-(e^x)^2}} dx$ j.) $\int \frac{e^x}{1+e^x} dx$ k.) $\int \frac{1}{1+e^x} dx$
l.) $\int \frac{x}{\sqrt{1-x^2}} dx$ m.) $\int \cos^2 x dx$ n.) $\int \cot x dx$ o.) $\int \cot^2 x \csc^2 x dx$
p.) $\int \frac{x^2 + 5x + 6}{x^2} dx$ q.) $\int \frac{x^2 + 5x + 6}{x + 1} dx$ r.) $\int (x^2 + 1)(x^3 + 3x)^{10} dx$
s.) $\int \frac{x + 6}{(x + 5)^2} dx$ t.) $\int \frac{(\ln x)^4}{x} dx$ u.) $\int \sec^2(3x) 2^{\tan(3x)} dx$

2.) Evaluate the following definite integrals.

a.) $\int_0^{\pi/2} \sin(x/2) dx$ b.) $\int_{-1}^1 \frac{x}{x^2 + 1} dx$ c.) $\int_e^{e^2} \frac{1}{x(\ln x)} dx$

3.) Find the area of the region bounded by the graphs of the given equations.

a.) $y = x, y = 2x$, and $x = 2$ b.) $y = e^x, x = 0$, and $y = 2$
c.) $x = y^2$ and $x = 9$ d.) $y = x - 2$ and $y = x^3 - 2x^2$

4.) If $\int_{-2}^1 f(x) dx = 3$ and $\int_{-2}^3 f(x) dx = -2$. What is the value of $\int_3^1 f(x) dx$?

5.) Assume that f is an odd function and $\int_{-2}^1 f(x) dx = 3$. What is the value of $\int_{-1}^{-2} f(x) dx$?

THE FOLLOWING PROBLEM IS FOR RECREATIONAL PURPOSES ONLY.

6.) Connect 6 toothpicks end-to-end to form 4 triangles.