

Math 21B
Vogler
Discussion Sheet 3

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

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

2.) Evaluate the following definite integrals.

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

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

$$\begin{array}{ll}
 \text{a.) } y = x, y = 2x, \text{ and } x = 2 & \text{b.) } y = e^x, x = 0, \text{ and } y = 2 \\
 \text{c.) } x = y^2 \text{ and } x = 9 & \text{d.) } y = x - 2 \text{ and } y = x^3 - 2x^2
 \end{array}$$

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.