

# AP Calculus AB Unit 6/7 Study Guide

1. Know how to compute the antiderivatives of power functions, trig functions,  $e$  &  $\ln$  functions. [6.1]

## Antiderivatives for Trig Functions:

$$\begin{aligned} \int \sin x \, dx &= -\cos x + C & \int \csc x \cot x \, dx &= -\csc x + C \\ \int \cos x \, dx &= \sin x + C & \int \sec x \tan x \, dx &= \sec x + C \\ \int \sec^2 x \, dx &= \tan x + C & \int \csc^2 x \, dx &= -\cot x + C \end{aligned}$$

## Antiderivatives for Exponential Rules/Logarithmic Rules

$$\begin{aligned} \int e^x \, dx &= e^x + C \\ \int \frac{1}{x} \, dx &= \ln|x| + C \end{aligned}$$

## Antiderivatives for Inverse Trig Functions

$$\begin{aligned} \int \frac{1}{\sqrt{1-x^2}} \, dx &= \sin^{-1} x + C & \int \frac{1}{1+x^2} \, dx &= \tan^{-1} x + C \end{aligned}$$

## Antiderivatives for Polynomials:

$$\int x^n \, dx = \frac{x^{n+1}}{n+1} + C$$

2. Understand the theory/idea of area under curves. Also be able to approximate area using LRAM, RRAM, MRAM, and Trapezoidal Rule. [6.2]

3. Be able to apply the Fundamental Theorem of Calculus Part 1 and Part 2. [6.3]

4. Know how to integrate using the substitution rule for compositions of functions. [7.1]

5. Be able to rewrite trig functions using trig identities in order to integrate. [7.2]

6. Know how to apply the first and second derivatives test to find local max/min, intervals of increase/decrease, concavity & point of inflection. [4.5, 4.6]

7. Know how to write justifications of answers.

Know how to do the following in the calculator:

- graph functions (or multiple functions)
- graph derivatives of functions
- find maximum & minimum values
- determine x-intercepts

Remember to approximate decimal answers to 3 decimal places.