

Unit 5: Logarithmic, Exponential, & Inverse Trigonometric Functions
5.2 Natural Log & Integration

Since

$$\frac{d}{dx} [\ln x] = \frac{1}{x}$$

Then

$$\boxed{\int \frac{1}{x} dx = \ln|x| + c}$$

*need absolute value since we can only log positive numbers

note: the power integration law $\int x^n dx = \frac{x^{n+1}}{n+1} + c$ does not work on $\frac{1}{x}$

$$\int \frac{1}{x} dx = \int x^{-1} dx =$$

ex.

$$\int \frac{2}{x} dx$$

ex.

$$\int \frac{x^2 + 1}{x^3 + 3x} dx$$

*integration of rational functions could lead to a natural log antiderivative, thus we use substitution method (let u = the denominator)

ex.

$$\int \tan x \, dx$$

ex. Determine the area under $y = \frac{x}{x^2+1}$ on $[0, 3]$.

If the degree of the numerator is equal or greater than the degree of the denominator try long division to split up the integrand.

$$\frac{\text{dividend}}{\text{divisor}} = \text{quotient} + \frac{\text{remainder}}{\text{divisor}}$$

ex.

$$\int \frac{x^2 + x + 1}{x^2 + 1} dx$$

ex.

$$\int \frac{(\ln x)^3}{x} dx$$

Practice Questions

Pg. 327/# 1 – 14, 19, 20, 23, 24, 33 – 38, 51 – 54, 57, 58, 61, 63, 69, 70



This document was created with the Win2PDF "print to PDF" printer available at
<http://www.win2pdf.com>

This version of Win2PDF 10 is for evaluation and non-commercial use only.

This page will not be added after purchasing Win2PDF.

<http://www.win2pdf.com/purchase/>