

# Calculus BC

## Section 5.2 - The Natural Log Function - Integration

- Obj: - To use the Log Rule for Integration to integrate rational functions.  
- To integrate trigonometric functions.

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

1.  $\int \frac{1}{3x-5} dx$

$u =$   
 $du =$

2.  $\int \frac{x^2}{x^3+5} dx =$

$$3. \int \tan x dx =$$

$$4. \int \frac{\sec^2 x}{\tan x} dx$$

**Simplifying an improper fraction –**

when degree of numerator is  $\geq$  degree of denominator

$$5. \int \frac{2x^2 + 3x + 2}{x^2 + 1} dx$$

-use long division to rewrite function

-rewrite as two separate Integrals

-integrate first integral, use \_\_\_\_\_ for the second

**Change of variables, separate, rewrite..**

5.  $\int \frac{5x}{(x+3)^2} dx$

-substitution

$u =$   $\rightarrow x =$

$du =$

-separate the fraction,  
separate the integral

-rewrite and integrate

6.  $\int \frac{1}{x(\ln x)^2} dx$

## Deriving the integral of sec x

$$7. \int \sec x dx$$

$$= \int \sec x \frac{(\sec x + \tan x)}{(\sec x + \tan x)} dx$$

=

-substitution

$$u = \sec x + \tan x$$

$$du =$$

Should memorize  $\int \sec x dx =$