

Section 5.2**The Natural Logarithmic Function---Integration**

Section 5.2: Integration with the Natural Log

Log rule: $\int \frac{1}{u} du = \ln |u| + c$ or $\int \frac{du}{u} = \ln |u| + c$

Trig Rules:

$\int \sin u du = -\cos u + C$	$\int \cos u du = \sin u + C$
$\int \tan u du = -\ln \cos u + C$	$\int \cot u du = \ln \sin u + C$
$\int \sec u du = \ln \sec u + \tan u + C$	$\int \csc u du = -\ln \csc u + \cot u + C$

Ex1: $\int \frac{10}{x} dx$

Ex2: $\int \frac{7}{3x+5} dx$

Ex3: $\int \frac{x}{\sqrt{9-x^2}} dx$

Ex4: $\int \frac{x^3 - 3x^2 + 4x - 9}{x^2 + 3} dx$

Ex5: $\int \frac{\csc^2 t}{\cot t} dt$

Ex6: $\int \tan 5\theta d\theta$

Ex7: Solve the differential equation. Find the solution which passes through the given point.

$$\frac{dr}{dt} = \frac{\sec^2 t}{\tan t + 1} \quad (\pi, 4)$$

Ex8: Evaluate the definite integral.

$$\int_e^{e^2} \frac{1}{x \ln x} dx$$

Ex 9: Find the indefinite integral by u-substitution. Hint: Let u be the denominator of the integrand.

$$\int \frac{1}{1 + \sqrt{2x}}$$