AP CALCULUS AB

INTEGRALS OF THE BASIC FUNCTIONS

$$\int x^p \mathrm{d}x = \frac{x^{p+1}}{p+1}, \quad p \neq -1$$

$$\int \frac{\mathrm{d}x}{x} = \ln|x|, \quad x \neq 0$$

These formulae follow from the DERIVATIVES INVOLVING THE TRIGONOMETRIC FUNCTIONS worksheet.

$$\int \sin x \, \mathrm{d}x = -\cos x$$

$$\int \cos x \, \mathrm{d}x = \sin x$$

$$\int \tan x \, \mathrm{d}x = \ln|\sec x|$$

$$\int \cot x \, \mathrm{d}x = \ln|\sin x|$$

$$\int \sec x \, \mathrm{d}x = \ln|\sec x + \tan x|$$

$$\int \csc x \, \mathrm{d}x = \ln|\csc x - \cot x|$$

These formulae follow from the DERIVATIVES INVOLVING THE INVERSE TRIGONOMETRIC FUNCTIONS worksheet.

`Note:` all inverse trigonometric functions are the principal branches.

$$\int \sin^{-1} x \, \mathrm{d}x = x \sin^{-1} x + \sqrt{1 - x^2} \qquad -1 < x < 1$$

$$\int \cos^{-1} x \, \mathrm{d}x = x \cos^{-1} x - \sqrt{1 - x^2} \qquad -1 < x < 1$$

$$\int \tan^{-1} x \, \mathrm{d}x = x \tan^{-1} x - \frac{1}{2}\ln(1 + x^2)$$

$$\int \cot^{-1} x \, \mathrm{d}x = x \cot^{-1} x + \frac{1}{2}\ln(1 + x^2)$$

$$\int \sec^{-1} x \, \mathrm{d}x = x \sec^{-1} x - \ln\left(|x| + \sqrt{x^2 - 1}\right) \qquad -\infty < x < -1 \text{ or } 1 < x < \infty$$

$$\int \csc^{-1} x \, \mathrm{d}x = x \csc^{-1} x + \ln\left(|x| + \sqrt{x^2 - 1}\right) \qquad -\infty < x < -1 \text{ or } 1 < x < \infty$$

$$\int e^x \mathrm{d}x = e^x$$

These formulae follow from the DERIVATIVES INVOLVING LOGARITHMIC AND EXPONENTIAL FUNCTIONS worksheet.

$$\int b^x \mathrm{d}x = \frac{b^x}{\ln b}$$

$$\int \ln|x| \, \mathrm{d}x = x \ln|x| - x, \quad x \neq 0$$

$$\int \ln x \, \mathrm{d}x = x \ln x - x, \quad x > 0$$

$$\int \log_N|x| \, \mathrm{d}x = x \log_N|x| - \frac{x}{\ln N}, \quad x \neq 0$$

$$\int \log_N x \, \mathrm{d}x = x \log_N x - \frac{x}{\ln N}, \quad x > 0$$