Chapter 4 - Integration

4.1a - Antiderivatives and Indefinite Integration

Anti-differentiation = Integration

Notation: F(x) means....

EXAMPLE 3 Rewriting Before Integrating

See LarsonCalculusforAP.com for an interactive version of this type of example.

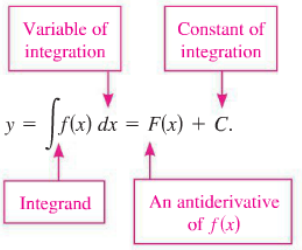
	Original Integral	*Rewrite*	*Integrate*	*Simplify*
a.	$\int \frac{1}{x^3}\,dx$	$\int x^{-3}\,dx$	$\frac{x^{-2}}{-2} + C$	$-\frac{1}{2x^2} + C$
b.	$\int \sqrt{x}\,dx$	$\int x^{1/2}\,dx$	$\frac{x^{3/2}}{3/2} + C$	$\frac{2}{3}x^{3/2} + C$
c.	$\int 2\sin x\,dx$	$2\int \sin x\,dx$	$2(-\cos x) + C$	$-2\cos x + C$
d.	$\int \frac{3}{x}\,dx$	$3\int \frac{1}{x}\,dx$	$3(\ln\lvert x\rvert) + C$	$3\ln\lvert x\rvert + C$

The properties of logarithms presented on page 50 can be used to rewrite antiderivatives in different forms. For instance, the antiderivative in Example 3(d) can be rewritten as

$$3\ln|x| + C = \ln|x|^3 + C.$$

AP Calc - 4.1a - Antidifferentiation **Date:_____**

$$\int \frac{1}{x^3}\,dx$$



$$\int x^n dx$$

Except....

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

EXAMPLE 5 Rewriting Before Integrating

$$\int \frac{x+1}{\sqrt{x}}\,dx =$$

You Try

20. $$\int \frac{x^4 - 3x^2 + 5}{x^4}\,dx$$

EXAMPLE 6 Rewriting Before Integrating

$$\int \frac{\sin x}{\cos^2 x}\,dx =$$

You Try

26. $\int (\sec y)(\tan y - \sec y)\,dy$