Section 5.1 Antiderivatives and Indefinite Integrals

# Topic 1: Antiderivatives

**Theorem**

If the derivatives of two functions are equal on an open interval , then the functions differ by at most a constant. Symbolically, if *F* and *G* are differentiable functions on the interval  and  for all *x* in , then  for some constant *k.*

A function *F* is an **antiderivative** of a function *f* if .

The notation  is called the **indefinite integral** and is used to represent the family of all antiderivatives of . If  we write .

The symbol is called the **integral sign** and  is called the **integrand**. The symbol  indicates that the antidifferentiation is performed with respect to the variable *x.* The arbitrary constant *C* is called the **constant of integration**.

# Topic 2: Formulas and Properties of Indefinite Integrals

**Indefinite Integrals of Basic Functions**

For *C*, a constant, the following formulas are true:

1.  , 
2. 
3. , 

**Properties: Indefinite Integrals**

For *k*, a constant, the following properties are true.

1. 
2. 

# Topic 3: Applications