

## Antiderivatives and Indefinite Integrals (5.3)

Integration reverses differentiation. We will learn more about that relationship when we talk about the Fundamental Theorem of Calculus. But first we need practice reversing differentiation, or finding **antiderivatives**.

Find all possible  $f(x)$  so that:

a)  $f'(x) = x^4 + 5x^{-2/3} - 1$ .

b)  $f'(x) = \cos(2x)$  if  $f(0) = 2$ .

**Definition:**  $\int f(x) dx = F(x) + C$  where  $F'(x) = f(x)$  is the **family of antiderivatives of  $f(x)$** .  
 $\int f(x) dx$  is the **indefinite integral of  $f(x)$** .

Evaluate  $\int \sec^2(y) dy$ .

Find  $g(u) \in \int \frac{1}{1+u^2} du$  if  $g(1) = 5$ .

Evaluate  $\int \frac{1}{x} - \cosh(x) dx$ .