

Name: _____

6.2 Derivatives and Antiderivatives

Finding anti-derivatives

Let $f(x) = \cos x$. Find an antiderivative, $F(x)$, so that $F'(x) = \cos x$. Can you find more than one function?

The *indefinite integral* of f is written as _____

where $F'(x) = f(x)$. Notice that there is a _____ of antiderivative functions.

1. Evaluate the following antiderivatives.

(a) $\int 2x \, dx =$

(c) $\int x^{28} \, dx =$

(b) $\int x^2 \, dx =$

(d) $\int 3 \, dx =$

Power Rule for Integrals

$$\int x^n \, dx = \underline{\hspace{2cm}}$$

2. Evaluate more antiderivatives.

(a) $\int 5e^x \, dx =$

(c) $\int p^2(p+2) \, dp =$

(b) $\int \frac{3}{t} \, dt =$

(d) $\int \left[\frac{\theta+1}{\theta} + \sec^2 \theta \right] d\theta =$

(e) $\int e^{5t} \, dt =$

3. Look at all of the antiderivatives you already know!

(a) $\int \sin x \, dx =$

(e) $\int \frac{1}{x} \, dx =$

(b) $\int \cos x \, dx =$

(f) $\int e^x \, dx =$

(c) $\int \sec^2 x \, dx =$

(g) $\int \frac{1}{1+x^2} \, dx =$

(d) $\int x^7 \, dx =$

(h) $\int \frac{1}{\sqrt{1-x^2}} \, dx =$

Using Antiderivatives to Compute Definite Integrals

$\int_0^3 f(x) \, dx =$ _____

4. Use an antiderivative to compute the following definite integrals

(a) $\int_1^2 3x \, dx =$

(b) $\int_0^{\frac{\pi}{4}} \sin x \, dx =$

5. Find the area between the curves $y = x^2$ and $y = 2 - x^2$.