TOPIC: ANTIDERIVATIVES

Antiderivatives

◆ We know how to find the *derivative* of a function; finding the **antiderivative** is just the _____ process.

► If $f(x)$ is the **derivative** of the function $F(x)$, then we can say that $F(x)$ is an _____**derivative** of $f(x)$.

New **Antiderivatives**

$f(x)$	derivative	$f'(x)$
$x^2 + \_\_\_\_$	→	$2x$
	← antiderivative	$f(x)$

EXAMPLE Find the antiderivative of the following functions.

(A) $f(x) = 3x^2$

(B) $f(x) = 3$

(C) $f(x) = 0$

◆ When finding an *antiderivative*, check your answer by taking the *derivative* of it.

TOPIC: ANTIDERIVATIVES

PRACTICE Find the antiderivative of the following function.

$f(x) = 200$

PRACTICE Find the antiderivative of the following function.

$f(x) = 5x^4$

TOPIC: ANTIDERIVATIVES

PRACTICE Find the antiderivative of the following function.

$f(x) = 10x^9$

TOPIC: ANTIDERIVATIVES

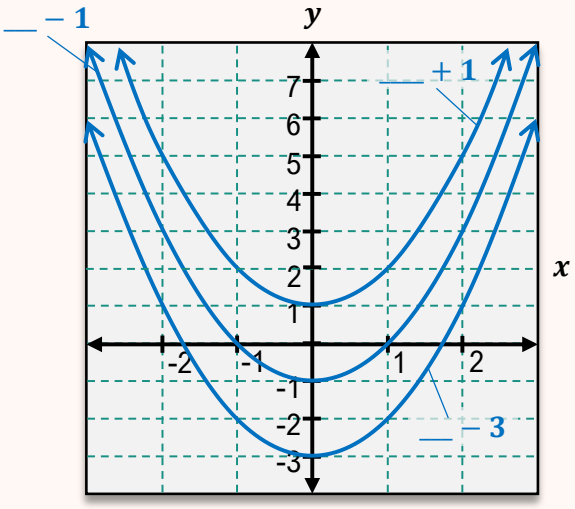
Finding a Particular Antiderivative

◆ The antiderivative of $f(x)$ is $F(x) + C$, which represents a _____ of antiderivatives.

► Given a specific point on the antiderivative, we can solve for C, which gives us a _____ antiderivative.

EXAMPLE Find the antiderivative of $f(x) = 2x$ given $F(2) = 3$.

New **Finding a Particular Antiderivative**



$f(x) = 2x$

$F(x) =$ **Find general antiderivative**

$F(\_\_) =$ **Apply given condition**

$= \quad +C$

$C =$

$F(x) = x^2$_____ **Write particular antiderivative**

EXAMPLE Find the antiderivative of $f(x) = 3x^2$ given $F(1) = 5$.

TOPIC: ANTIDERIVATIVES

PRACTICE For the following function $f(x)$, find the antiderivative $F(x)$ that satisfies the given condition.

$f(x) = 5x^4; F(0) = 1$

PRACTICE For the following function $f(x)$, find the antiderivative $F(x)$ that satisfies the given condition.

$f(x) = 100x^{99}; F(1) = 101$