WARM-UP

Given the derivative, find the function:

1. $F'(x) = 2x - 5$

2. $F'(x) = 8x + 2$

3. $F'(x) = 12x$

4. $F'(x) = 3x^2 + 3$

5. $F'(x) = -2x^{-3}$

6. $F'(x) = \frac{1}{2}x^{-\frac{1}{2}}$

SECTION 4.10
ANTIDERIVATIVES

- F(x) is the antiderivative of f(x) if F'(x) = f(x).

- The most general antiderivative of f(x) is F(x) + C, where C is an arbitrary constant.

- Rules:

Derivatives   Antiderivatives

f(x) = a   F(x) = ax + C

k f(x)   k F(x) + C

f(x) = x^n

$$F(x) = \frac{x^{n+1}}{n+1} + C$$

EXAMPLES

Derivatives

$f(x) = 17$

$f(x) = 3x^2$

$f(x) = x^7$

$f(x) = x^{-3}$

$f(x) = \sqrt[5]{x}$

$f(x) = \dfrac{1}{x^5}$

$f(x) = x(x^3 - 3)$

Antiderivatives

TRIGONOMETRY RULES

Derivatives

f(x) = cos x

f(x) = sin x

f(x) = sec² x

f(x) = sec x tan x

f(x) = csc² x

f(x) = csc x cot x

Antiderivatives

F(x) = sin x + C

F(x) = -cos x + C

F(x) = tan x + C

F(x) = sec x + C

F(x) = -cot x + C

F(x) = -csc x + C

EXAMPLE

- $g'(x) = 4 \sin x + \dfrac{2x^5 - \sqrt{x}}{x}$ find g(x)

EXAMPLE

- Find f(x) if $f'(x) = x\sqrt{x}$ and f(1) = 2

EXAMPLE

- Find f(x) if $f''(x) = 12x^2 + 6x - 4$, f'(0) = -3 and f(1) = 1