Precalc15.2

Find derivatives and antiderivatives of polynomial functions

slope

function

inverse function

derivative

antiderivative



Constant

Quiz 15.2 Tomorrow

Use the derivative rules to find the derivative of each function.

6.
$$f(x) = 2x^2 - 3x + 5x$$

Find the derivative of:

$$x^3 = 3 \times \frac{1}{2}$$

 $x^3 + 5 = 3 \times \frac{1}{2} + 5$
 $x^3 + 13 = 3 \times \frac{1}{2} + 5$
 $x^3 - 7 = 3 \times \frac{1}{2} + 5$
 $x^3 - 1,000,000 = 3 \times \frac{1}{2} + 5$

So if I tell you $3x^2 \dots$

$$x^3 \leftarrow 3x^2$$
 $x^3 + C$

Can I ever know what the constant might have been????

What is the pattern?

term previous
$$f'(x) = anti f'(x)$$

$$3x^{2} = \chi^{3} + c$$

$$4x^{3} = \chi^{4} + c$$

$$8x^{7} = \chi^{3} + c$$

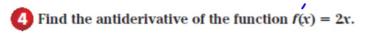
$$x^{4} + c$$

$$x^{5} = \chi^{7} + c$$

$$\frac{12\chi}{n} = \chi^{5} + c$$

$$\chi^{6} + c$$

$$\chi^{6}$$



What is 2x the derivative of?

F

Was there a constant? Can I ever know what it was? Find the antiderivative of each function. a. $f(x) = 3x^7$ indefinite...could it have been +7? -3? +1,000,000?... Can I ever know??? Might as well admit it...

$$E = \frac{8}{3x} + C$$

As with derivatives, there are rules for finding antiderivatives.

p. 955

Power Rule:

If $f(x) = x^n$, where n is a rational number other than -1, the antiderivative is $F(x) = \frac{1}{n+1} x^{n+1} + C$.

Why C?

Constant Multiple of a Power Rule:

If $f(x) = kx^n$, where n is a rational number other than -1 and k is a constant, the antiderivative is

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

Sum and Difference Rule: If the antiderivatives of f(x) and g(x) are F(x) and G(x), respectively, then the antiderivative of $f(x) \pm g(x)$ is $F(x) \pm G(x)$.

b.
$$f(x) = 4x - 7x + 5$$

$$F(x) = 4 \frac{x^3}{3} - \frac{7x^2}{2} + \frac{5x^1}{1} + C$$

$$\frac{N+1}{\binom{N+1}{2}}$$

distributive property

c.
$$f(x) = x(x^{2} + 2) = \chi^{3} + 2 \times$$

$$F(x) = \frac{\chi^{4}}{4} + \frac{2\chi^{2}}{2} = \frac{\chi^{4}}{4} + \chi^{2} + C$$

Find the antiderivative of each function.

10.
$$f(x) = x^2$$

11. $f(x) = x^3 + 4x^2 - x - 3$

12. $f(x) = 5x^5 + 2x^3 - x^2 + 4$

$$F(x) = \frac{1}{3} \times \frac{3}{3} + C = \frac{1}{3} \times \frac{3}{3} + C$$

$$F(x) = \frac{1}{3} \times \frac{3}{3} + C = \frac$$

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Physics:
F = Position
f = Velocity X
f' = Acceleration

f" = Impulse
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15.2

10-12