WARM UP EXERCSE

A cable company has found that the total number N (in thousands) of subscribers t months after the installation of the system is given by

N(t) = 200t / (t+5)

Find N (15) and N ' (15). Write an interpretation of these results.

§11.4 Chain Rule: Power Form

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The student will learn about:

•the easy version of the chain rule,

•combining different rules of derivation

application

Some examples

$$\frac{d}{dx}(5x^3)^2 = \frac{d}{dx}(25x^6) = \frac{d}{dx}(5x^3)^2 = \frac{d}{dx}((5x^3)(5x^3)) = \frac{d}{dx}(5x^3)^3 = \frac{d}{dx}((5x^3)^2(5x^3)) = \frac{d}{dx}(5x^3)^3 = \frac{d}{dx}($$

Some examples

$$\frac{d}{dx}(u(x))^{2} = \frac{d}{dx}((u(x))(u(x))) =$$

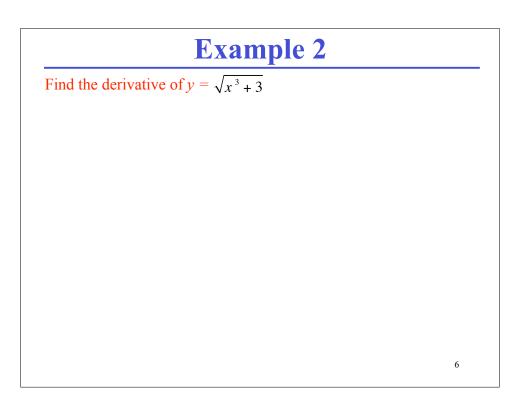
$$\frac{d}{dx}(u(x))^{3} = \frac{d}{dx}((u(x))^{2}(u(x))) =$$
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Chain Rule: Power Rule.

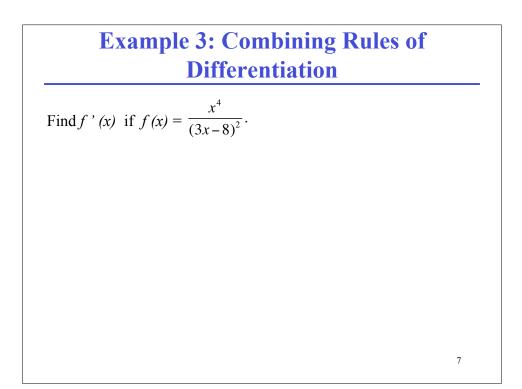
Theorem 1. (General Power Rule or easy Chain Rule) If u (x) is a differential function, n is any real number, and

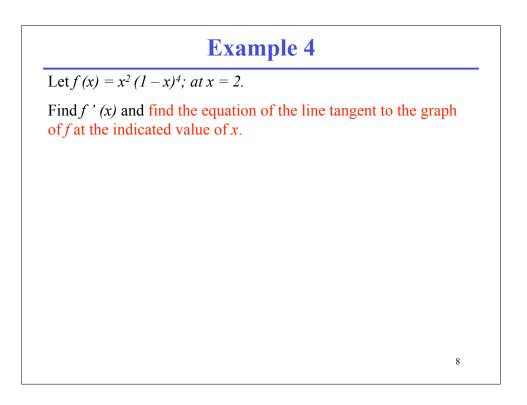
 $f(x) = [u(x)]^{n}$ then $f'(x) = n[u(x)]^{n-1}u'(x)$ $= n u^{n-1}u'$ or $\frac{d}{dx}u^{n} = n u^{n-1}\frac{du}{dx}$

Find the derivative of $y = (x^3 + 2)^5$.



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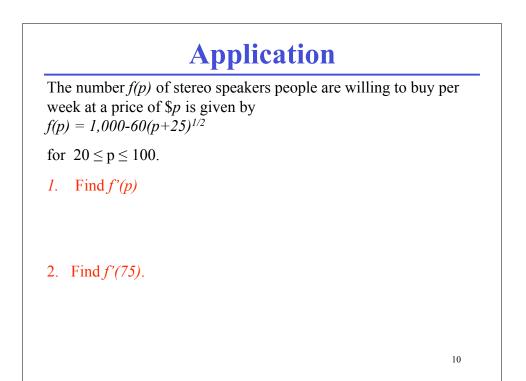
Application

The number f(p) of stereo speakers people are willing to buy per week at a price of \$*p* is given by $f(p) = 1,000-60(p+25)^{1/2}$

for $20 \le p \le 100$.

1. Let $f(p) = 1,000-60(p+25)^{1/2}$ what is f(75)?

2. What does it mean?



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