# Chapter 11 – 3 Derivatives of Products and Quotients

**Example 1.** Find the derivative of

Find the derivative of F(x)G(x):



In our problem, F(x) = x2 and G(x)=ex:

**Example 2.** Find the derivative of two different ways.

A) Write f(x) as

B) Apply the product rule where

**Example 3.** Find the derivative of

**Example 4.** Find the derivative of

If then

If

****

**Example 5.** Find the derivative of

**Example 6.** Find the derivative of



**Example 7.** Find the derivative of

**Example 8.** The number of CDs sold is given by where N is thousands of CDs and t is the number of months since the CD was released.

A) Find N(10) and N’(10) and interpret the results.

thousand CDs will be sold in the first 10 months.

, total sales are increasing at the rate of 4,000 CD’s per month.

B) Use the results of part A to estimate the total sales after 11 months. Compare this estimate to the actual value.

 thousand CDs will be sold in the first 11 months.

 thousand CDs will be sold in the first 11 months. The estimated value was 316 CDs higher than the actual number of CDs (an error of about 0.5%).

**Example 9.** A drug is injected into the bloodstream of a patient through the right arm. The concentration of the drug (in milligrams per cubic centimeter) in the blood stream of the left arm t hours after the injection is given by



A) Find the instantaneous rate of change in the concentration of the drug relative to time after a half hour and after 3 hours. Interpret the results.

. The concentration is increasing at the rate of 0.0672 mg/cc per hour.

. The concentration is decreasing at the rate of 0.0112 mg/cc per hour.

B) What is the highest concentration of the drug and when does it occur?

 when t = 1 hour. The highest concentration is mg/cc.