MA104 Lesson 9

Product and Quotient Rule

Monday, 28 January, 2008

Outline

Admin

Last Class

Product and Quotient Rule
- Course Guide
- Product and Quotient Rules
  - Definitions
- Board Work

Look Forward - Derivatives of Trig Functions
- Course Guide

Admin

1. IT Lab for the next two days - No class until Thursday 31 January!
2. Block I Homework due Friday 01 February in class.
3. Don't forget proper documentation!
4. Challenge Problems due Thursday 31 January for some sort of reward. Problem 4 in Block I - Block Problems.
5. I will return Quizzes when everyone has taken the makeup.
6. Find the rate of change of: $\frac{r^3}{3}$

Derivatives of Power, Exponential, and Log Functions

Questions?

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Objectives

1. Calculate derivatives using the Product Rule.
2. Calculate derivatives using the Quotient Rule.

READ

1. Stewart: Section 3.2, pages 183-187.
2. Student Notes.

THINK ABOUT

1. Why **doesn't** $\frac{d}{dx}f(x)g(x) = f'(x)g'(x)$?

DO Problems

1. Section 3.2/ 1, 4, 5, 7, 26, 27, 33, 34
2. Section 3.6/ 10, 16, 24

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Definitions

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4. $f'(x) = 2x$ and $g'(x) = 3x^2$ so the product would be $6x^3$
5. However, if we multiply first we get $f(x)g(x) = x^5$ and the derivative of this product is $5x^4$.

Definitions

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6. So the Product rule states $(f(x)g(x))' = f'(x)g(x) + f(x)g'(x)$

Definitions

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7. In words: derivative of the first times the second plus derivative of the second times the first

Definitions

1. The Quotient Rule is

$$\left(\frac{f(x)}{g(x)}\right)' = \frac{f'(x)g(x) - f(x)g'(x)}{g(x)^2}$$

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2. In words Low-D-Hi minus Hi-D-Low over Low-Squared

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3. Amazingly enough this is really just the product rule which we will see when we learn the Chain-Rule

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Board Work

1. Rate of population growth versus rate of growth of heat consumption.

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Lesson 10 - Derivatives of Trig Functions

1. OBJECTIVES:
   1.1 Be able to calculate the derivatives of the six trigonometric functions.
2. READ:
   2.1 Stewart: Section 3.3, pages 189-195.
   2.2 Student Notes.
3. THINK ABOUT:
   3.1 What is unique about the natural exponential function?
4. DO:
   4.1 Section 3.3/ 1, 3, 6, 7, 10, 13, 14, 23, 31

Questions?

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