

Calculus

Date:

Items Needed: .Book, Product rule for 3 or more variables handout

Objective: The students will use the Product and Quotient rules and Higher Order Derivatives to find the slope of a tangent line at a given point.

Lesson:

- Put up $(3x - 2x^2)(5 + 4x)$ and ask how you would find the derivative of this?
- Multiply it out and then find the derivative.
- Theorem 2.8 the Product rule can help us out so we don't have to multiply as much.
- $\frac{d}{dx}[f(x)g(x)] = f(x)g'(x) + g(x)f'(x)$
- Do the previous example using the Product Rule.
- Do find the derivative of $f(x)=x\cos x$.
- Look at example 3 and point out the note on the bottom of page 148.

- What happens when we have a problem that looks like this? $\frac{3x-4}{2x^2-2}$

- We use the Quotient Rule:
$$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x)f'(x) - f(x)g'(x)}{[g(x)]^2}$$
- Solve the example from above using the Quotient Rule.
- Graph this equation with its derivative and answer the technology question on p. 149.

- Look at example 5 and notice how they simplified everything down to one numerator and one denominator.
- Use negative exponents to show how you could have completed the same problem without simplifying.

- Point out that not every quotient needs to be differentiated by the Quotient Rule. Some simple reductions or pulling out a multiple would help to eliminate the need for the Quotient Rule.
- In example 6, look at a and b and do c and d.

- Point out theorem 2.10 and look at the proof on page 151.
- Differentiate $x\csc x$ and $4x^2 - \tan x$

- Look at example 9 and discuss the equivalency of the two equations and which you would choose to find the derivative of.
- Always remember, the 2 characteristics of a simplified form are the absence of negative exponents and the combining of like terms.
- Look at the examples on the bottom of page 152.

Assignment: . 5, 6, 7, 9, 11, 27, 32, 36, 41, 44, 47, 51-59(o), 60, 65, 67, 70, 71, 73, 75, 78, 79, p. 154

Evaluation: (Could be from any one/several of the following)

- Responses from classroom questions
- Results of classroom sample problems
- Homework responses
- Check answer with Calculator
- End of the section exam

Enrichment: