

Calculus

Date:

Items Needed: .Book,.

Objective: The students will determine the difference between explicit and implicit differentiation.

Lesson:

- Put up the equation $y=4x^2 - 5$ is what we consider an explicit function. It is already solved for y.
- Most of the time you can solve for y in an equation but there are many equations that you can't solve for y for.
- For instance $3xy=2$ or $y^3 + y^2 - 5y - x^2 = -4$
- The first equation can be solved for y fairly easily and then the derivative can be found.
- The second is a little harder to solve for y.
- Instead of trying to solve for y we learn another way to find the derivative so we don't have to try and solve for y.
- To understand how to find dy/dx implicitly, you must realize that the differentiation is taking place with respect to x. This means that when you differentiate terms involving x alone, you can differentiate as usual. However, when you differentiate terms involving y, you must apply the Chain Rule, because you are assuming that y is defined implicitly as a function of x.
- Put up some of the examples from example 1. (substitute dy/dx with y prime.
- Differentiate the example $y^3 + y^2 - 5y - x^2 = -4$, outlining the rules for implicit differentiation as you go.
- This equation gives you the slope equation. The only difference in finding the instantaneous rate of change is that you need both the x and y values to substitute back into the equation.

- How would you go about graphing this equation on the calculator? Since there is one x value you can use parametric equations. Look at the bottom of the page and show how. Don't forget to change the range of t.

- Remind students when an equation is not differentiable. Vertical tangents.
- Look at example 3 p. 175.
- Do number 31, p. 179 in the book.
- Make reference to example 4 in the book.
- Do example 5

Assignment: Have students do 4, 6, 9, 12, 15, 20, 21, 28, 30, 32, 33, 34, p. 179

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: