Board Work

1. Find y' by implicit differentiation.
2. Solve explicitly for y and differentiate to get y' in terms of x.
3. Check your solutions are consistent by substituting the expression for y into your solution. For the following problems.
   1. $4x^2 + 9y^2 = 36$
   2. $\cos x + \sqrt{y} = 5$
4. Find dy/dx by implicit differentiation for the following problems.
   1. $x^2 + xy - y^2 = 4$
   2. $x^2y^2 + x \sin y = 4$

MA104 LESSON 22

IMPLICIT DIFFERENTIATION

Wednesday, 20 February, 2008

Outline

1. Admin
2. Last Class
3. IMPLICIT DIFFERENTIATION
   - Course Guide
   - IMPLICIT DIFFERENTIATION
     - Definitions
   - Do Problem - Help
   - The Dreaded Thayer Board Work
4. Look Forward - RELATED RATES I
   - Course Guide

Admin

1. I will not be here Thursday or Friday, February 21 or 22. You will have a substitute teacher. Be nice!
2. Section Marcher: email Major Tom Deveans the attendance after each class.
3. Make-up Quizzes use outlook to schedule AI with me to take the make-up.
4. WPR 2 is next Tuesday - 26 February 2008. This WPR is during normal class period in this classroom.
5. PSL 3 will be a board problem and a review.
6. Write Mathematica templates for everything we have covered this block. You can use your computer on this exam.
7. Fundamentals of Derivative Test takers use outlook to schedule test.
8. Fish Fry - Shuttle from Grant Turn-Around on the hour from 1700-1900. Cost $12, Tilapia and Whiting.

Problem Solving Lab 2

Questions?

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Objectives

1. Understand what is meant by implicitly and explicitly defined functions.
2. Use the method of implicit differentiation to find the derivative of implicitly defined functions.

READ

1. Stewart: Section 3.5, pages 207-211 (Stop at Derivatives of Inverse Trig Functions).
2. Student Notes.

THINK ABOUT

1. Why is it sometimes necessary to use implicit differentiation?

DO Problems

1. Section 3.5/ 1, 5, 9, 10, 25, 38

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Definitions

1. Explicit Differentiation - We describe on variable explicitly in terms of another like $y = \pm\sqrt{25 - x^2}$ or in general $y = f(x)$

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4. Implicit Differentiation consists of differentiating both sides of the equation with respect to x and then solving the resulting equation for y'.

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2. Implicit Differentiation can be used if you see something like $x^2 + y^2 = 25$
3. Under Figure 3 pg. 208
4. Implicit Differentiation consists of differentiating both sides of the equation with respect to x and then solving the resulting equation for y'.
5. Think of implicit differentiation like the chain rule - so we look at something like the derivative with respect to x of y^2 will look like $2y\dfrac{dy}{dx}$.

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Do Problem - Help

Section 3.5/ 1, 5, 9, 10, 25, 38

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Board Work

1. Board Problems

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LESSON 23 - RELATED RATES I

1. OBJECTIVES:
   1. Model and solve problems using relationships between rates of change. These are normally referred to as related rates problems. Some of the common types of problems are:
      1. Changing surface area problems
      2. Changing volume problems
      3. Pythagorean Theorem problems
      4. Similar triangles problems
      5. Changing angle problems
2. READ:
   1. Stewart: Section 3.9, pages 241-245.
   2. Student Notes.
3. THINK ABOUT:
   1. How can dimensional analysis assist in setting up a problem that relates rates of change?
   2. How can a good diagram or picture assist in setting up a problem that relates rates of change?
   3. What are two examples in your set of experiences where things change with time and affect other things?
4. DO:
   1. Section 3.9/ 2, 5, 7, 11, 12

Questions?

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