

**TI-84 Labs For Mathematics 224**

**Introductory Analysis II**

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### TI-84+ Lab 1 for Mathematics 224

**Topic:** graphing implicit function and its derivative

**Graphing An Implicit Equation and Its Derivative.** Graph implicit equation

$$R(x, y) = y^2 + x^2 - 1 = y^2 + 0y + (x^2 - 1) = 0,$$

where  $a = 1, b = 0, c = x^2 - 1$ , can be written explicitly in terms of  $y$ :

$$y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{0 \pm \sqrt{(0)^2 - 4(1)(x^2 - 1)}}{2(1)} = \pm \sqrt{1 - x^2}$$

an *equation* where each “half” of the equation consists of a differentiable function; upper half function  $y = \sqrt{1 - x^2}$  has derivative  $\frac{dy}{dx} = -\frac{x}{\sqrt{1-x^2}}$  and lower half function  $y = -\sqrt{1 - x^2}$  has derivative  $\frac{dy}{dx} = \frac{x}{\sqrt{1-x^2}}$

To graph in the TI-84+ calculator, set WINDOW -3 3 1 -2 2 1 1

GRAPH functions  $Y_1 = \sqrt{1 - X^2}$ , and  $Y_2 = -\sqrt{1 - X^2}$

GRAPH derivatives using  $Y_3 = -\frac{x}{\sqrt{1-x^2}}$ , and  $Y_4 = \frac{x}{\sqrt{1-x^2}}$