

## Implicit Differentiation (3.8)

Is  $x^2 + y^2 = 1$  a function of  $y$  in terms of  $x$ ? Why or why not?

Is  $x^2 + y^2 = 1, y \leq 0$  a function of  $y$  in terms of  $x$ ?

What is the function's derivative? First we find it explicitly.

Now we will find the derivative **implicitly**.

We can find the derivative by differentiating both sides of an equation with respect to the independent variable, using the chain rule, and then solving for the derivative.

Find the equation of the tangent line to the curve  $y^4 + xy^2 - 2 = 0$  at the point  $(1, 1)$ .

We can use this method of implicit differentiation to find derivatives of inverse functions.

Find the derivative of  $y = \arctan(x)$ .

Find the derivative of  $y = \sin^{-1}(x)$ .

Find the derivative of  $y = \arccos(x)$ .

As time allows:

Find the tangent line to the graph of  $9x^2 + 4y^2 = 36$  at  $(1, 2)$ . But first tell me the sign of the derivative by inspecting a sketch of the graph.