Sometimes, a the dependent variable y cannot easily written explicitly as a function of x. Therefore it is important that we can still find out the derivative of the variable y with respect to x. To do this, we use the chain rule.

**Example 1.** *Find the slope of the tangent line of the graph*

$$x^2 + y^2 = 1$$

**Solution.** *We take the derivative of the equation with respect to x for both sides, we have*

$$\begin{aligned} \frac{d}{dx}(x^2 + y^2) &= \frac{d}{dx}0 \\ 2x + 2yy' &= 0 \\ y' &= -\frac{x}{y} \end{aligned}$$

*The reason why the derivative of the second term is 2yy' is because we assume that y is a function of x, therefore $y^2$ is a composite function which the "outer function" is square and the "inner function" is $y(x)$.*