2.6. Implicit Differentiation and Related Rates

Example
Find
$$\frac{dy}{dx}$$
 if $x + \frac{1}{y} = 4$.

Implicit Differentiation

Suppose an equation defines y implicitly as a differentiable function of x. To find the derivative of y,

- Differentiate both sides of the equation with respect to *x*. Remember that *y* is really a function of *x* and use the chain rule when differentiating terms containing *y*.
- 2. Solve the differentiated equation algebraically for $\frac{dy}{dx}$.

Find
$$\frac{dy}{dx}$$
 using implicit differentiation if $x + \frac{1}{y} = 4$.

Implicit Differentiation

Example
Find
$$\frac{dy}{dx}$$
 if $4x - x^3y^2 = 2y$.

Implicit Differentiation

Example

Find the equation of the tangent line to the curve $x^2y^2 - 3xy = 5x + y + 1$ at the point (0, -1).