Implicit Differentiation

- When differentiating in terms of just x – differentiate as usual
- *Implicit Differentiation* – When differentiating terms involving y – you must use the Chain Rule (y is defined implicitly as a function of x)
- Guidelines for Implicit Differentiation
    - Differentiate both sides of the equation with respect to x
    - Collect $\frac{dy}{dx}$ terms
    - Factor out $\frac{dy}{dx}$ term
    - Solve for $\frac{dy}{dx}$
- EXAMPLES:

1. $\frac{d}{dx}[2x^3] =$
2. $\frac{d}{dx}[y^4] =$
3. $\frac{d}{dx}[x^2 + 2y^2 + 3] =$

4. Find $\frac{dy}{dx}$ of $x^2y + y^2x = -2$

5. Determine the slope of $x^2 - y^3 = 5$ at the point $(1, 1)$

6. Find y'' of $1 - xy = x - y$