Implicit Differentiation

Implicit versus Explicit

Explicit: _____

Implicit: _____

Determine whether each function is defined implicitly or explicitly:

1. $y = 5x^3 - 2x^2 + 3x - 2$

2. $8x^2 + 3xy + 4y^2 = 1$

Examples: Find $\frac{dy}{dx}$.

1. $y = 5x^3 - 2x^2 + 3x - 2$

2. $8x^2 + 3xy + 4y^2 = 1$

More Examples: Find $\frac{dy}{dx}$ and the slope of the tangent line at the given point.

3. $x^2 + y^2 = 1$, (0, 1)

4. $4x^2 - 2y^2 = 9$, (3/2, 0)

5. $x^3 + y^3 = 3xy$, (3/2, 3/2)

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

Implicit Differentiation

Class Work: Find $\frac{dy}{dx}$ and the slope of the tangent line at the given point.

1. $x^2 - y^2 = 16$, (5, -3)

2. $xy + y = 9$, (2, 3)

3. $x^2y + xy^2 = 2x$, (1, 1)

4. $(x + y)^2 + y = 2$, (0, 1)

5. $x^2 + 4y^2 = 4$, (2, 0)

Extra Credit: 6. $y + \sqrt{xy} = 4$, (2, 2)