 Name_____

Implicit Differentiation

Date_____ Period____

For each problem, use implicit differentiation to find $\frac{dy}{dx}$ in terms of x and y.

1) $2x^3 = 2y^2 + 5$

2) $3x^2 + 3y^2 = 2$

3) $5y^2 = 2x^3 - 5y$

4) $4x^2 = 2y^3 + 4y$

5) $5x^3 = -3xy + 2$

6) $1 = 3x + 2x^2y^2$

7) $3x^2y^2 = 4x^2 - 4xy$

8) $5x^3 + xy^2 = 5x^3y^3$

9) $2x^3 = (3xy + 1)^2$

10) $x^2 = (4x^2y^3 + 1)^2$

11) $\sin 2x^2y^3 = 3x^3 + 1$

12) $3x^2 + 3 = \ln 5xy^2$

For each problem, use implicit differentiation to find $\frac{d^2y}{dx^2}$ in terms of x and y.

13) $4y^2 + 2 = 3x^2$

14) $5 = 4x^2 + 5y^2$

Critical thinking question:

15) Use three strategies to find $\frac{dy}{dx}$ in terms of x and y, where $\frac{3x^2}{4y} = x$. Strategy 1: Use implicit differentiation directly on the given equation. Strategy 2: Multiply both sides of the given equation by the denominator of the left side, then use implicit differentiation. Strategy 3: Solve for y, then differentiate. Do your three answers look the same? If not, how can you show that they are all correct answers?