Calculus Name_____

Implicit Differentiation (Examples)

Date_____ Period____

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

1) $5x^3 + 1 = \cos 3y^3$

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

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

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

5) $5x = 3x^2y + 4$

6) $3x^2 - 2x^2y^3 = 5$

7) $-5y^3 + 3x^3y^3 = 3x^3$

8) $3x^3 - x^3y = 3y$

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

10) $-4xy + 4x^3y^2 = 2x$

11) $(3x^3 + 5) \cdot 4y^2 = 2x^2$

12) $x = (5x^2 + 4) \cdot 2y^3$

13) $\frac{3x + 5}{3y^2} = 5x^2$

14) $5x = \frac{5x^2 + 5}{y^2}$

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

15) $x^3 + 4y^2 = 5$

16) $x = y^2 + 4$

For each problem, use implicit differentiation to find $\frac{d^2y}{dx^2}$ at the given point.

17) $2x^2 + y^2 = 3$ at $(1, 1)$

18) $4x = 2y^2 + 2$ at $(1, 1)$