Calculus AP/Dual Worksheet Rev 2017 **Name: _____**

§2.5: Implicit Differentiation **Date: _____ Period _____**

Find $\frac{dy}{dx}$ by implicit differentiation. Show all steps on separate sheet of paper.

1) $x^2 + y^2 = 9$

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

3) $x^{1/2} + y^{1/2} = 16$

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

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

6) $x^3 - 3x^2y + 2xy^2 = 12$

7) $\sin x + 2\cos(2y) = 1$

8) $\sin x = x(1 + \tan y)$

9) Find $\frac{dy}{dx}$ by implicit differentiation of $xy = 6$ and evaluate at $(-6, -1)$

10) Find $\frac{dy}{dx}$ by implicit differentiation of $y^2 = \frac{x^2 - 49}{x^2 + 49}$ and evaluate at $(7,0)$

11) Find $\frac{dy}{dx}$ by implicit differentiation of $x^{2/3} + y^{2/3} = 5$ and evaluate at $(8,1)$

Find the second derivative, $\frac{d^2y}{dx^2}$

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

13) $x^2 - y^2 = 36$

14) $x^2 + xy = 25$

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15) Given the curve: $xy^2 + x^2y^2 = 6$

(a) Find $\frac{dy}{dx}$

(b) Evaluate $\frac{dy}{dx}$ at the point $(2,1)$

(c) Write an equation for the tangent line to the curve at the point $(2,1)$

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16) Evaluate the horizontal and vertical tangent lines of $25x^2 + 16y^2 + 200x - 160y + 400 = 0$.