6.1 Implicit Differentiation

Calculus Name: _____ **CA #1**

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

1. $5x^3 = -4y^5 + 10$

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

3. $x - 5y^4 = 12$

4. $-4y + 3y^2 + 7 = 4x^2$

5. $(2y^4 + 1)^2 = 5x^2$

6. $4x^2 = (2y^3 + 4)^2$

7. $\cos(2x + y) = 5x$

8. $5x + 2 = \sin(4y^2)$

9. $e^{5y^2} = x^3 + 3$

10. $2 - e^{4y^4} = -3x^4$

11. $\ln(2y^2) = 4x + 1$

12. $2x^3 - x = \ln(y^4)$

13. $1 = 3x^4 - 4x^4y$

14. $4x^2 - 2x^4y^4 = 5$

Use implicit differentiation to find $\frac{d^2y}{dx^2}$.

15. $y^3 + 2y = 3x + 10$

16. $xy^5 = 5$

Find the slope of the tangent line at the given point.

17. $x^3 + 5y^3 = 3y^4$ at $(2, 2)$

18. $3y^4 = x^4 - 2x^3y^2$ at $(-1, 1)$

Answers to 6.1 CA #1

1. $-\frac{3x^2}{4y^4}$	2. $\frac{16x^3}{12y^3-3}$	3. $\frac{1}{20y^3}$	4. $\frac{4x}{-2+3y}$	5. $\frac{5x}{16y^7+8y^3}$	6. $\frac{x}{3y^5+6y^2}$
7. $-\frac{5}{\sin(2x+y)} - 2$	8. $\frac{5}{8y\cos(4y^2)}$	9. $\frac{3x^2}{10ye^{5y^2}}$	10. $\frac{3x^3}{4y^3e^{4y^4}}$	11. $2y$	12. $\frac{6xy-y}{4}$
13. $\frac{3-4y}{x}$	14. $\frac{1-x^2y^4}{x^3y^3}$	15. $-\frac{54y}{(3y^2+2)^3}$	16. $\frac{4y}{25x^2}$	17. $\frac{1}{3}$	18. $-\frac{5}{4}$