
Calculus Homework, Week 9-10: Implicit Differentiation, Tangents, and Normals
Due Wednesday 16 November 2005
Mr. Quinn

Part I: On another sheet of paper, find $\frac{dy}{dx}$ for these expressions.

1. $x^3 - y^3 = 2y$
2. $x^2 - 16xy + y^2 = 1$
3. $x^6 + 11x^3y^2 = 3y^3$
4. $\frac{y^3 - 2x}{4x + 11y} = x$
5. $y^3 + 2y = 5x + 11x^4$
6. $y^2 - \sin x = \sin y + \cos x^2$
7. $7x^4 + 2xy^2 = 8 - 4y^3$
8. $3x^3 - 4x^4 + 9 = y$

Part II: Find $\frac{d^2y}{dx^2}$ for each of these equations.

1. $x^3 - y^3 = 2y$
2. $x^2 + 6y^2 = 6$
3. $x^2 - 4x = 2y - 2$

Part III: Find the equation of both the tangent line and the normal line at the indicated value of x for these functions.

1. $y = 3x^2 - x$ at $x=1$.
2. $y = \sqrt{8x}$ at $x=2$.
3. $y = \frac{x+3}{x-3}$ at $x=4$.
4. $y = \sqrt{x^3 - 15}$ at $x=4$.
5. $y = \frac{x^2 + 4}{x - 6}$ at $x=5$.