

Homework Assignment 25: Due at the beginning of class 12/10/01

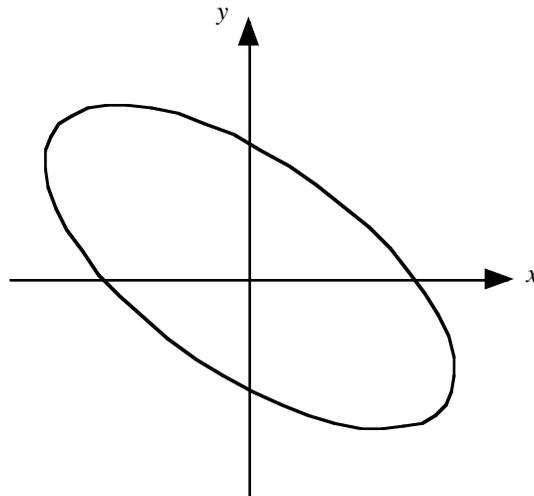
In Questions 1 and 2, find an equation for the derivative $\frac{dy}{dx}$. Your equation may involve both x and y , but the derivative $\frac{dy}{dx}$ should be the subject of the equation (and not appear anywhere else in the equation).

1. Find an expression for $\frac{dy}{dx}$ when: $x + x \cdot y + y^2 = 1$.
2. Find an expression for $\frac{dy}{dx}$ when: $x \cdot y + \ln(y) = 3$.
3. Find an expression for $\frac{dy}{dx}$ when: $e^y + e^x = 10$.

The equation,

$$x^2 + 2x \cdot y + 3y^2 = 2$$

defines the elliptical curve pictured below. Questions 4 and 5 refer to this equation and this elliptical curve.



4. Find an equation for $\frac{dy}{dx}$.
5. Verify that the point $(x, y) = (0, \sqrt{\frac{2}{3}})$ lies on the curve, and calculate the equation of the tangent line to this point on the curve.