#s 1,2 (a) Find y' by implicit differentiation.
(b) Solve the equation explicitly for y and differentiate to get y' in terms of x.
(c) Check that your solutions to parts (a) and (b) are consistent by substituting the expression for y into your solution for part (a).

1. $9x^2 - y^2 = 1$
2. $\frac{1}{x} + \frac{1}{y} = 1$

#s 3 - 11: Find $\frac{dy}{dx} = y'$ by implicit differentiation.

3. $x^3 + y^3 = 1$
4. $x^2 + xy - y^2 = 4$
5. $x^4(x+y) = y^2(3x-y)$
6. $y\cos x = x^2 + y^2$
7. $4\cos x \sin y = 1$
8. $\tan\left(\frac{x}{y}\right) = x + y$
9. $\sqrt{xy} = 1 + x^2 y$
10. $y\cos x = 1 + \sin(xy)$

11. If $f(x) + x^2[f(x)]^3 = 10$ and $f(1) = 2$, find $f'(1)$.
12. Regard y as the independent variable and x as the dependent variable, and use implicit differentiation to find $\frac{dx}{dy}$, if x and y are related by the equation $x^4y^2 - x^3y + 2xy^3 = 0$

#s 14, 15: Use implicit differentiation to find an equation of the tangent line to the curve at the given point.

13. $y\sin(2x) = x\cos(2y)$ @ $\left(\frac{\pi}{2}, \frac{\pi}{4}\right)$.
14. $x^2 + xy + y^2 = 3$ @ $(1,1)$ (*ellipse*)
15. Find an equation of the tangent line to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ @ (x_0, y_0).
16. Show, using implicit differentiation, that any tanget line to the circle at a point P on the circle, with center O, is going to be perpendicular to the radius OP.