Implicit Differentiation WS 1

Directions: use implicit differentiation to find the following derivatives.

1) Find $\frac{dy}{dx}$ if $x^3 - y^3 = y$

2) Find $\frac{dy}{dx}$ if $x^2 - 16xy + y^2 = 1$

3) Find $\frac{dy}{dx}$ if $\frac{x+y}{x-y} = 3$

4) Find $\frac{dy}{dx}$ if $\cos y - \sin x = \sin y - \cos x$

5) Find $\frac{dy}{dx}$ if $16x^2 - 16xy + y^2 = 1$

6) Find $\frac{dy}{dx}$ if $\sqrt{x} + \sqrt{y} = 2y^2$

7) Find $\frac{dy}{dx}$ if $x\sin y + y\sin x = \frac{\pi}{2\sqrt{2}}$

8) Find $\frac{d^2y}{dx^2}$ if $x^2 + 4y^2 = 1$

9) Find $\frac{d^2y}{dx^2}$ if $\sin x + 1 = \cos y$

10) Find $\frac{d^2y}{dx^2}$ if $x^2 - 4x = 2y - 2$

11) Find $\frac{dy}{dt}$ if $y = 3t^{\sqrt{t}}$

12) Find $\frac{dy}{dx}$ if $y = (\cot x)^{\sin^{-1}x}$

13) Show that $f(x) = \begin{cases} 2x^2 - 1, & x < 2 \\ 7, & x = 2 \\ 3x + 1, & x > 2 \end{cases}$ is continuous @ $x = 2$.