Impicit Differentiation Worksheet

I. Algebra review

Solve for the variable indicated:

1. Solve for x: $3x+3=5x-5$
2. Solve for x: $ax+3=bx-5$
3. Solve for x: $2ax=3bx+y$
4. Solve for x: $ax+by=cz$
5. Solve for $\frac{dy}{dx}$: $3\left(\frac{dy}{dx}\right)-x=y+\left(\frac{dy}{dx}\right)$
6. Solve for $\frac{dy}{dx}$: $x^2\left(\frac{dy}{dx}\right)+x^2=yx+y^2\left(\frac{dy}{dx}\right)$

II. Determine $\frac{dy}{dx}$ for each of the following:

7. $y=x^2+xy$
8. $x^2y+y=3$
9. $x+\sin(y)=y+1$
10. $y\sqrt{x}+x\sqrt{y}=16$

III. Solve the following:

11. Given $x^2+y^2=9$
    a) Determine $\frac{dy}{dx}$
    b) Where do the horizontal tangents to the curve occur?
    b) Where do the vertical tangents to the curve occur?
12. Determine $\frac{d^2y}{dx^2}$ for $1-xy=x-y^2$
13. Show that the graphs of the two relations given below are ORTHOGONAL.
    $2x^2+y^2=6$
    $y^2=4x$
14. Find $\frac{dy}{dx}$ for $x^2y^2=3$ at $\left(\sqrt{3},1\right)$.