Class - 4

Implicit functions, Problems

1. If $u = e^{x^2+y^2}$ and $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, find \ \frac{du}{dx}$. **Ans: $2xe^{x^2+y^2}\left(\frac{a^2-b^2}{a^2}\right)$**

2. If $ylog(cosx) = xlog(siny)$, find $\frac{dy}{dx}$. **Ans: $\frac{ytanx+logsiny}{logcosx-xcoty}$**

3. If $z = \sqrt{x^2 + y^2}$ and $x^3 + y^3 + 3axy = 5a^2$, show that $\frac{dz}{dx} = 0$ when $x = y = a$.

4. Find the total differential coefficient of x^2y w.r.t x when x, y are connected by $x^2 + xy + y^2 = 1$. **Ans: $\frac{dy}{dx} = \frac{x(xy-2x^2+4y^2}{x+2y}$**

5. If $y^3 - 3ax^2 + x^3 = 0$, then prove that $\frac{d^2y}{dx^2} = -\frac{2a^2x^2}{y^5}$.