Assignment Sheet - 5

1. Use Fourier transform to solve $\frac{d^2 y}{dx^2} + 6 \frac{dy}{dx} + 9 y = e^{-3x}, x > 0$, given that $y(0) = 0 = y'(0)$.

2. Use Fourier transform to solve $\frac{d^2 y}{dx^2} - 4 \frac{dy}{dx} + 3 y = \cos 3x, x > 0$, given that $y(0) = 0 = y'(0)$.

3. Solve $\frac{d^2 y}{dx^2} - \frac{dy}{dx} - 6 y = e^{3x}, x > 0$, given that $y(0) = 1, y'(0) = 2$ by the Fourier transform method.

4. Solve the integral equation $f(x) - \frac{1}{4} \int_{-\infty}^{\infty} f(t) e^{-2|x-t|} dt = e^{-x^2}$ by using the Fourier transform.

5. Evaluate the integral $\int_{0}^{\infty} \frac{dx}{(x^2+9)(x^2+16)}$ by using Fourier transform