EE1002 Principles of Electronic Engineering Tutorial 3

1. Evaluate the following integrals.

(a) $\int_0^2 xe^x\,dx$
(b) $\int_0^2 x^2e^x\,dx$
(c) $\int \frac{2e^{tanx}}{cos^2x}dx.$

2. Solve the following differential equations for y.

(a) $\frac{dy}{dx} = 3\cos 2x$
(b) $\frac{dy}{dx} = 3x^2e^{-y}$ with the initial condition of $y(0) = 1$
(c) $\frac{dy}{dx} = \frac{y^2}{x^2} + \frac{y}{x} + 1$ (Hint: You may let $z = \frac{y}{x}$)

3.
(a) Reduce each of the following expressions to a single sinusoidal function:
(i) $(\sin x - \cos x)^2 - 1$
(ii) $\sin x \cos x \cos 2x \cos 4x$

(b) Reduce the following expression to a single sinusoidal function and state the amplitude, frequency and phase of the single sinusoidal function:
$2\sin(3t + \pi/6) + 4\cos 3t$