Homework Assignment 3 in Differential Equations, MATH308

due to June 6, 2012

Topics covered : *method of integrating factor (corresponds to sections 2.1).*

1. Find the general solution of the differential equation

$$ty' + 2y = \sin 2t, \quad t > 0.$$

and determine how the solutions behave as $t \to +\infty$.

2. (a) Solve the initial value problem

$$y' - 10y = t^2 e^{9t}, \quad y(0) = a \tag{1}$$

(b) How do the solutions of (1) behave as t goes to $+\infty$? Show that this behavior depend on the choice of the initial value a and find the value a_0 for which the transition from one type of behavior to another occurs;

(c) Describe the behavior of the solution of (1) corresponding to the initial condition $y(0) = a_0$, where a_0 is as in the previous item.