Math 386, Section E1, Spring 2006
Quiz 12, April 27 **Name:** _____

Consider the ODE

$$\dot{x}(t) = 3x(t) + 9e^{-2t}$$

1. [5 points] Find all solutions of this ODE

2. [5 points] Find the solution of this ODE such that $x(1) = x(0)$.

Answers

1.
$$x(t) = Ce^{3t} + 9\int_{s=0}^{t} e^{3t-2t}dt = Ce^{3t} + 9(e^t - 1).$$

2. We want
$$C = x(0) = x(1) = Ce^3 + 9(e - 1);$$
we need
$$C = \frac{9(e-1)}{1-e^3};$$
thus
$$x(t) = \frac{9(e-1)}{1-e^3}e^{3t} + 9(e^t - 1).$$