Name: _____
Section: _____

Math 46: Quiz 7
March 12, 2015

Please show all work and solve the following problems.

1. Solve the following ODE using Method of Undetermined Coefficients:

$$y'' - 4y' - 12y = 32e^{2t}$$

***Solution*:** The homogeneous problem is:

$$y'' - 4y' - 12y = 0$$

And we solve it using the characteristic equation"

$$\lambda^2 - 4\lambda - 12 = 0$$
$$(\lambda - 6)(\lambda + 2) = 0$$

So we have that $\lambda = -2, 6$. So the homogeneous solution is

$$y_h(t) = c_1 e^{-2t} + c_2 e^{6t}$$

Now for the particular solution, we choose $y_p(t) = Ae^{2t}$. Plugging into the ODE, we have

$$4Ae^{2t} - 8Ae^{2t} - 12Ae^{2t} = 32e^{2t}$$
$$-16Ae^{2t} = 32e^{2t}$$

So we have that $-16A = 32$ so $A = -2$. Then the particular solution is $y_p(t) = -2e^{2t}$. So the general solution:

$$y(t) = y_h(t) + y_p(t)$$
$$y(t) = c_1 e^{-2t} + c_2 e^{6t} - 2e^{2t}$$

□