Name: SOLUTIONS

Quiz #6 - February 25, 2005

1. Find a general solution:

$$y'' - 3y' + 3y = 0$$

$r^2 - 3r + 3 = 0$

$r = \frac{3 \pm \sqrt{-3}}{2}$

$= \frac{3}{2} \pm \frac{\sqrt{3}}{2} i$; $\lambda = 3/2$ $\mu = \frac{\sqrt{3}}{2}$

$y = c_1 e^{\frac{3}{2}t} \cos \frac{\sqrt{3}}{2} t + c_2 e^{\frac{3}{2}t} \sin \frac{\sqrt{3}}{2} t$

2. Solve the initial value problem:

$$y'' + 4y' + 4 = 0, \; y(1) = 1, \; y'(1) = 0$$

$(r+2)^2 = 0$

$y = c_1 e^{-2t} + c_2 t e^{-2t}$

$y' = -2c_1 e^{-2t} - 2c_2 t e^{-2t} + c_2 e^{-2t}$

$1 = c_1 e^{-2} + c_2 e^{-2}$ $\quad e^2 = c_1 + c_2$

$0 = -2c_1 e^{-2} - 2c_2 e^{-2} + c_2 e^{-2}$ $\quad 0 = -2c_1 - c_2$

$c_2 = -2c_1$

$c_1 - 2c_1 = e^2$

$c_1 = -e^2$

$c_2 = 2e^2$

$y = -e^2 e^{-2t} + 2e^2 t e^{-2t}$

$y = -e^{2-2t} + 2te^{2-2t}$