

# Quiz #3 Solutions

The University of Oregon Logo

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*Hi everyone. This is the U of Oregon Logo here to tell you the solutions to the quiz. I see that I have been chosen by Corey in one of his NCAA basketball brackets to win the whole tournament, so I'm really excited. Anyway, ROCK ON!*

1. Consider  $y'' - 8y' + 15y = 2e^{4t}$ .
  - (a) If you let  $y = ae^{4t}$ , and crank out what the left hand side is, then you'll arrive at  $-ae^{4t} = 2e^{4t}$ , thus a particular solution will be  $y = -2e^{4t}$ .
  - (b) Seeing that the characteristic polynomial has two roots which are distinct, we have a fundamental set of solutions:  $\{y_1, y_2\}$  where  $y_1 = e^{3t}$ , and  $y_2 = e^{5t}$ .
  - (c) The general solution would be  $y = -2e^{4t} + C_1e^{3t} + C_2e^{5t}$ .
  - (d) Imposing the initial conditions on our general solution, we have the system of linear equations:

$$\begin{aligned} 1 &= -2 + C_1 + C_2, \\ 3 &= -8 + 3C_1 + 5C_2. \end{aligned}$$

The unique solution to this is  $C_1 = 2, C_2 = 1$ .

**ROCK ON!**