



WEEK IN REVIEW SESSION #5 (SECTIONS 3.4-3.6)

This document contains the answers and video solutions to the posed problems. Click the red box to watch the video solution. You can also watch all videos by viewing the [Session 5 playlist](#). In the event that this weekly review handout is updated, the Session video playlist will reflect the most updated problem set. Closed captions are available for all videos and the speed of the videos may be adjusted inside of "Settings" or the cog in the bottom right corner.

1. Find the general solution of the equation $y'' + 2y' + y = 0$.

Answer: $y = e^{-t}(c_1 + c_2t)$

[Click here to see video solution to problem #1](#)

2. Find the general solution of the equation/solve the initial value problem

(a) $y'' + 6y' + 9y = t \cos(2t)$

Answer: $y = c_1e^{-3t} + c_2te^{-3t} + \left(\frac{5t}{169} + \frac{18}{2197}\right)\cos(2t) + \left(\frac{12t}{169} - \frac{92}{2197}\right)\sin(2t)$

[Click here to see video solution to problem #2\(a\)](#)

(b) $4y'' + y' = 4t^3 + 48t^2 + 1$

Answer: $y = c_1 + c_2e^{-\frac{t}{4}} + t^4 + t$

[Click here to see video solution to problem #2\(b\)](#)

(c) $y'' + 2y' + y = 4e^{-t}$, $y(0) = 2$, $y'(0) = 1$

Answer: $y = (2 + 3t + 2t^2)e^{-t}$

[Click here to see video solution to problem #2\(c\)](#)



3. Find the form of a particular solution for each of the following nonhomogeneous equations.

(a) $y'' + 2y' + 2y = e^{-t} \sin t + e^{-t} \cos 2t$

Answer: $y_p = Y = te^{-t}[A \cos(t) + B \sin(t)] + e^{-t}[C \cos(2t) + D \sin(2t)]$

[Click here to see video solution to problem #3\(a\)](#)

(b) $y'' - 2y' + y = te^t + t^2e^{-t} + e^t \cos t + t^2$

Answer: $y_p = Y = t^2e^t(At+B) + e^{-t}(Ct^2+Dt+E) + e^t(F \cos(t) + G \sin(t)) + Ht^2 + It + J$

[Click here to see video solution to problem #3\(b\)](#)

4. Find the general solution of the equation $y'' + 6y' + 9y = \frac{e^{-3x}}{1+2x}$.

Answer: $y = c_1e^{-3x} + c_2xe^{-3x} - \frac{1}{4}(1+2x - \ln(|1+2x|))e^{-3x} + \frac{1}{2} \ln(|1+2x|)xe^{-3x}$

[Click here to see video solution to problem #4](#)