# EXAM 2 - MATH 310

George Voutsadakis

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YOUR NAME:_____

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Solve the initial value problem $y'' + 2y' - 15y = 0$, with $y(0) = 4$ and $y'(0) = -12$.

2. Find the general solution of the differential equation $y'' + 4y' + (4 + \frac{\pi^2}{4})y = 0$.

3. Solve the initial value problem $y'' - y = 5t^2 - 7$, with $y(0) = 10$ and $y'(0) = 2$.

4. Find the general solution of the differential equation $y'' - 2y' - 3y = e^{-t} + \sin 7t$.

5. (Please **explain fully!!**) Determine $b$ and $c$ so that the differential equation

$$y'' + by' + cy = 2014e^{-t} + 2015e^t$$

have a particular solution $Y(t)$ of the following form, for some constants $A, B$:

(a) $Y(t) = At^2e^t + Be^{-t}$

(b) $Y(t) = Ate^t + Bte^{-t}$