

YOUR NAME: _____

George Voutsadakis

Read each problem **very carefully** before starting to solve it and do only what is asked. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. [6 points] Solve the following initial value problem:

$$y'' + 3y' + 2y = g(t), \quad y(0) = 1, \quad y'(0) = 0.$$

2. [6 points] The goal here is to use convolutions to compute the integral

$$h(t) = \int_0^t \sin(5(t - \tau)) \cos(3\tau) d\tau.$$

(a) First find $H(s) = \mathcal{L}\{h(t)\}$.

(b) Decompose $H(s)$ into partial fractions.

(c) Use the partial fraction decomposition of Part (b) to find an explicit formula for $h(t)$ (not involving a convolution integral).