

Instructor: Leopoldo P. Franca

NAME: _____

TEST # 3:

Please show all your work in the test. Guessed answers are NOT acceptable. You may use calculators. Good luck!

(25 pt) 1) Express the following function $f(t)$ in terms of unit step functions and find its Laplace transform:

$$f(t) = \begin{cases} \sin(\pi t), & 0 \leq t < 1 \\ (t-1)^2, & t \geq 1 \end{cases}$$

(25 pt) 2) Solve the following initial value problem using the Laplace transform technique:

$$y'' + 9y' = \delta(t - \pi)$$

$$y(0) = 2$$

$$y'(0) = 0$$

(25 pt) 3) Find the general solution of

$$x^2 y'' + xy' + y = 1$$

(25 pt) 4) Find the general solution of

$$x'' = 2y - 5x$$

$$y'' = 2x - 2y$$