Print Your Name Legibly:_____

Score:_

Instructions: You must show supporting work to receive full and partial credits. No text book, notes, formula sheets allowed.

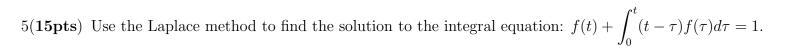
1(10pts) Use the definition of Laplace transform to find $\mathcal{L}{f(t)}(s)$ if $f(t) = \begin{cases} 0, & t < 2 \\ 2, & t \ge 2. \end{cases}$

2(20pts) Find the Laplace transform or inverse transform:

(a)
$$\mathcal{L}\{te^{2t}f(t)\}(s)$$
 given that $\mathcal{L}\{f(t)\}(s) = \frac{1}{\sqrt{s}}$.

(b)
$$\mathcal{L}^{-1} \left\{ \frac{5 - 2s}{s(s^2 - 2s + 5)} \right\} (t).$$





6(20pts) The eigenvalues for the matrix $A = \begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$ are given as 0, 1, 2. Find the general solution to the system of equations $\mathbf{x}' = A\mathbf{x}$.