

**DIRECTIONS**

Provide complete legible solutions to the following problems in the space provided. Be sure to supply all the details that support your solutions

Problems 1 and 2. Use Theorems in Text to find Laplace transform of  $f$

1.  $f(t) = t^2 e^{2t}$  Ans \_\_\_\_\_

2.  $f(t) = e^t \sin t$  Ans \_\_\_\_\_

3. Express the given function using the Heavy side, then find its Laplace transform.

$$f(t) = \begin{cases} t+1 & 0 \leq t < 1 \\ 0 & t \geq 1 \end{cases}$$

Ans \_\_\_\_\_

4. Find  $\ell^{-1}\left\{\frac{s}{s^2 - 4s + 1}\right\}$

Ans \_\_\_\_\_

3. Find  $L^{-1}\left\{\frac{e^{-2s}}{s^2 - 1}\right\}$

Ans \_\_\_\_\_

4. Find  $\ell^{-1}\left\{\frac{1}{(s+1)^2}\right\}$

Ans \_\_\_\_\_

5. Use the Laplace Transform to solve the given initial value problem  
 $y' + y = te^{-t}$ ,  $y(0) = 1$