Exam 4 Math 321 Spring 2007

Show all work.

1. Find the Laplace transform of

$$f(t) = \begin{cases} t & \text{if } 0 < t < 10 \\ 0 & \text{if } t > 10 \end{cases}$$

2. Using partial fraction decomposition, find the inverse Laplace transform of

$$F(s) = \frac{10}{(s-1)(s-2)}$$

3. Using the Convolution method, find the inverse Laplace transform of

$$F(s) = \frac{10}{(s-1)(s-2)}$$

4. Let y be a continuous function of t that satisfies the differential equation

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

(a) Find $F(s) = \mathcal{L}\{y\}$.

(b) Find $y = \mathcal{L}^{-1}\{F(s)\}$.