

Name: \_\_\_\_\_

**Math 3336**  
**Spring 2005**  
**Test III**  
**Answers**

1. Find the inverse Laplace transform of

$$\frac{3s + 2}{s^2 + 4s + 6}$$

Answer:  $3e^{-2t} \cos \sqrt{2}t - 2\sqrt{2}e^{-2t} \sin 2t$

2. Solve the initial value problem

$$x'' + x = u_{\frac{\pi}{6}}(t), \quad x(0) = 1, \quad x'(0) = 0$$

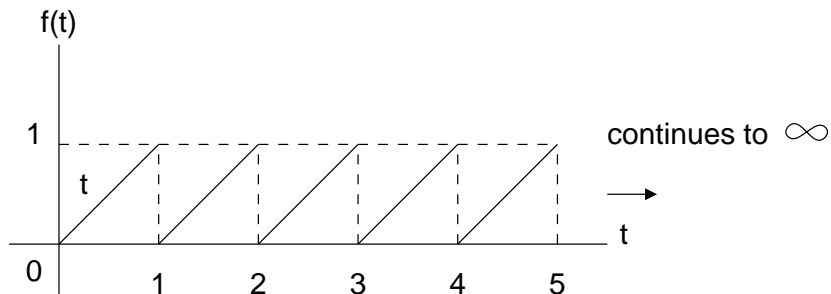
( Note that  $u_{\frac{\pi}{6}}(t) \equiv u\left(t - \frac{\pi}{6}\right)$  )

Answer:  $x(t) = \cos t + \left(1 - \cos\left(t - \frac{\pi}{6}\right)\right) u_{\frac{\pi}{6}}(t)$

3. Solve the initial value problem

$$x' = x + \cos t, \quad x(0) = 1$$

4. Find the Laplace transform of the function depicted in the graph



Answer:  $\frac{1}{s^2} - \frac{e^{-s}}{s(1 - e^{-s})}$