January 11, 2019

KMÜ 237-21/22 Engineering Mathematics

HOMEWORK 5 (Due January **30,** 2019)

Name:…… Number:……...

1. Solve the following initial value problem by using the Laplace transforms.

$\ddot{x} + x = 3$

$x(\pi) = 1$

$\dot{x}(\pi) = 2$

2. Find $f(t) = L\{ F(s) \}$ for the function

$$F(s) = \frac{2s^3 - 2s + 1}{s^2(s^2 - 1)}$$

3. A function u(x,y) is called harmonic if it satisfies Laplace's equation; that is; $u_{xx}+u_{yy}=0$.

Which of the following functions are harmonic?:

a) 3x+4y+1

b) $e^{3x}\cos 3y$

c) $\sin(e^x)\cos(e^y)$

4. Find the general solution of the following differential equations

a) $x^2y'' + xy' - \left[4x^2 + \frac{1}{2}\right]y = 0$

b) $x^2y'' + 2xy' + (x^2 - 1)y = 0$