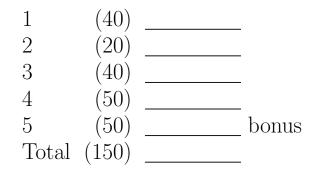
DEPARTMENT OF MATHEMATICS UNIVERSITY OF KANSAS MATH 220 - SAMPLE EXAM 3

Your Name: _____

On this exam, you may use a calculator and a list of formulas.

It is not sufficient to just write down the answers. You must explain how you arrived at your answers and how you know they are correct.



(1) (40 points) Find the solution of the initial value problem using the Laplace transform. |x'' - 2x' + 2x = 0

$$\begin{vmatrix} y'' - 2y' + 2y = 0\\ y(0) = 1, y'(0) = 0 \end{vmatrix}$$

 $\mathbf{2}$

(2) (20 points) Find the inverse Laplace transform of the function $F(s) = \frac{(s-2)e^{-s}}{s^2-4s+3}$.

(3) (40 points) Find the solution of the initial value problem using the Laplace transform. $\int dt' = 2t = 0$

$$\begin{vmatrix} y'' - y' - 2y = 0\\ y(0) = 1, y'(0) = 1 \end{vmatrix}$$

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(4) (50 points) Find the solution of the initial value problem and describe its behavior for increasing t. Use Laplace transform.

$$\begin{cases} y'' + 2y' + 5y = 1 - u_{10}(t) \\ y(0) = 0, y'(0) = 0 \end{cases}$$

(5) **(50 points) bonus problem** Use Laplace transform to find the solution of the initial-value problem.

$$y^{(4)} - y = u_1(t) - u_2(t)$$

$$y(0) = 0, y'(0) = 0, y''(0) = 0, y'''(0) = 0$$