KF

Math 301 (072) / Exam II (Ch 4 & 12)

Show your Work. **Total Grade: 25** **Time: 75 min**

1. Find $\mathcal{L}^{-1}\left\{\dfrac{1}{(s-3)^2+2}\right\}$

2. Find $\mathcal{L}\{f(t)\}$ of $f(t)=\begin{cases}0 & 0<t<3\\ (t-3)^5 & t>3\end{cases}$

3. Solve:

$$y''+9y=\delta(t-2)$$
$$y(0)=0 \quad y'(0)=1$$

4. Expand $f(x)=x$, $0<x<3$, in a Fourier-Bessel series using Bessel functions that satisfy $J_1(3\lambda)=0$.

5. Find the Fourier series expansion of

$$f(x)=\begin{cases}1 & -3<x<0\\ 0 & 0<x<1\\ 1 & 1<x<3\end{cases}$$

To what value does this series converge at $x=7$.

6. Find the eigenvalues and eigenfunctions for

$$y''+\lambda y=0,$$
$$y'(0)=0,\ y'(4)=0.$$

Distribution of points: Q1= 3pts, Q2= 3pts, Q3 = 4pts, Q4 = 5pts, Q5 =5pts, Q6 =5pts.