Due at the beginning of class on the day of Test 2

Direction: Solve the problems in this worksheet on separate sheets of paper. Write your solution neatly. Use standard size paper. Clearly label each problem, and include each problem in the correct order. No ragged edges. Staple multiple pages. At the top of the first page put your name, Math 2320, and the title of the homework assignment.Show all work to justify your answer. Answer with insufficient work will receive no credit.

Problem 1: Find Inverse Transforms

Find the inverse Laplace transform:

1. $\mathscr{L}^{-1}\left\{\frac{1}{s^2}-\frac{48}{s^5}\right\}$
2. $\mathscr{L}^{-1}\left\{\frac{5}{s^2+49}\right\}$
3. $\mathscr{L}^{-1}\left\{\frac{10s}{s^2+16}\right\}$
4. $\mathscr{L}^{-1}\left\{\frac{1}{s^2}-\frac{1}{s}+\frac{1}{s-2}\right\}$

Problem 2: Find Inverse Transforms-Termwise division and Linearity

Find the inverse Laplace transform:

1. $\mathscr{L}^{-1}\left\{\frac{(s+2)^2}{s^3}\right\}$
2. $\mathscr{L}^{-1}\left\{\frac{2s-6}{s^2+9}\right\}$
3. $\mathscr{L}^{-1}\left\{\left(\frac{2}{s}-\frac{1}{s^3}\right)^2\right\}$
4. $\mathscr{L}^{-1}\left\{\frac{(s+1)^3}{s^4}\right\}$.

Problem 3: Find Inverse Transforms-Partial Fractions-Linear Factors

1. $\mathscr{L}^{-1}\left\{\frac{1}{s^2+3s}\right\}$
2. $\mathscr{L}^{-1}\left\{\frac{s}{s^2+2s-3}\right\}$
3. $\mathscr{L}^{-1}\left\{\frac{s^2+1}{s(s-1)(s+1)(s-2)}\right\}$.

Problem 4: Solve a Second-Order IVP using Laplace Transform

Use the Laplace transform to solve the IVP:

1. $y''-4y'=6e^{3x}-3e^{-x}$, $y(0)=1$, $y'(0)=-1$
2. $y''+y=\sqrt{2}\sin(x\sqrt{2})$, $y(0)=10$, $y'(0)=0$
3. $y''+9y=e^{x}$, $y(0)=0$, $y'(0)=0$.

Problem 5: Solve a Third-Order IVP using Laplace Transform

Use the Laplace transform to solve the IVP:

1. $2y'''+3y''-3y'-2y=e^{-x}$, $y(0)=0$, $y'(0)=0$, $y''(0)=1$
2. $y'''+2y''-y'-2y=\sin(3x)$, $y(0)=0$, $y'(0)=0$, $y''(0)=1$.