

Math 240 - Assignment 11

April 30, 2026

Name _____

Score _____

This assignment is for practice only. It will not be collected.

1. Find the convolution of $f(t) = t$ and $g(t) = t^3$.

2. Use convolution to determine the inverse transform of $F(s) = \frac{1}{(s-1)(s+5)}$.

3. Suppose the Laplace transform of $g(t)$ exists. Use Laplace transforms to solve the initial value problem. Use convolution to write your final answer as an integral containing the function g . (Do any partial fraction decompositions by hand. They should be easy.)

$$y'' + 5y' + 4y = g(t); \quad y(0) = 1, \quad y'(0) = 2$$

4. Use Laplace transform methods to solve the following equation.

$$tx'' - tx' + x = 2, \quad x(0) = 2, \quad x'(0) = -1$$

5. Let $f(x) = x$ on $(-\pi, \pi)$. Find the Fourier series for f .