Name: _____ **Sort #:** _____

Worksheet 16: Solve IVPs with Step Functions

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You are permitted to use technology to assist you with factoring and partial fraction decompositions. All other work should be done by hand. Solutions that do not have an appropriate amount of detail will not receive credit!

1. (20 pts) Use the Laplace transform to find the solution of the initial value problem

$$y'' + 4y = \sin(t) - u_{2\pi}(t)\sin(t - 2\pi), \quad y(0) = 0, \quad y'(0) = 0$$

2. (20 pts) Use the Laplace transform to find the solution of the initial value problem

$$y'' + y = f(t); \quad y(0) = 0; \quad y'(0) = 0; \quad f(t) = \begin{cases} t, & 0 \le t < 2\pi \\ -2t, & 2\pi \le t < \infty \end{cases}$$