Quiz 7, Math 246, Professor David Levermore
Tuesday, 30 October 2018

Your Name:

Discussion Instructor (circle one):   Sid Sharma   Anqi Ye
Discussion Time (circle one):   8:00   9:00   10:00

No books, notes, calculators, or any electronic devices.
Show your reasoning for full credit. Good luck!

Short Table: $\mathcal{L}[t^n e^{at}](s) = \dfrac{n!}{(s-a)^{n+1}}$ for $s > a$, $\mathcal{L}[u(t-c)j(t-c)](s) = e^{-cs}\mathcal{L}[j](s)$.

(1) [4] Use the definition of the Laplace transform to compute $\mathcal{L}[f](s)$ for the function $f(t) = u(t-2)e^{3t}$, where u is the unit step function.

(2) [3] Find the Laplace transform $X(s)$ of the solution $x(t)$ of the initial-value problem
$$x'' - 9x = 0, \qquad x(0) = 2, \quad x'(0) = -4.$$
DO NOT solve for $x(t)$, just $X(s)$!

(3) [3] Find $y(t) = \mathcal{L}^{-1}[Y](t)$ where $Y(s) = e^{-4s}\dfrac{15}{(s-2)(s+3)}$.