

NAME: _____

APMA 0330 — Applied Mathematics - I

Brown University
Homework, Set 8

Fall, 2017
Due December 6

8.1 (40 pts) Find the inverse Laplace transforms of the following functions.

(a) (10 pts) $\mathcal{L}^{-1} \left[\frac{\lambda^2 - 9}{(\lambda^2 + 9)^2} e^{-\lambda} \right] =$

(b) (10 pts) $\mathcal{L}^{-1} \left[\frac{2}{(\lambda - 2)^2 + 4} \right] =$

(c) (10 pts) $\mathcal{L}^{-1} \left[\frac{5}{\lambda^2 + \lambda - 6} \right] =$

(d) (10 pts) $\mathcal{L}^{-1} \left[\frac{32}{(\lambda - 3)^2 (\lambda + 1)^2} \right] =$

8.2 (20 pts) Using the Laplace transform, solve the initial value problem.

$$2y'' - 7y' + 3y = H(t) - H(t - 2), \quad y(0) = 0, \quad y'(0) = 1.$$

8.3 (40 pts) Using the Laplace transform, solve the initial value problem.

$$y'' - 2y' + 5y = \sin(2t) [H(t - \pi) - H(t - 5\pi)], \quad y(0) = 0, \quad y'(0) = 0.$$