

UNIVERSITY OF NEW BRUNSWICK
DEPARTMENT OF MATHEMATICS & STATISTICS

MATHEMATICS 3503: Differential equations for engineers (Winter 2010)
Assignment 5 (due: Wednesday February 10, 2010)

1. Use partial fractions (if necessary) and the First Shifting Theorem (if necessary) to find the inverse Laplace transform of the the following:

(a) $F(s) = \frac{s + 7}{s^2 + 3s + 11}$

(b) $F(s) = \frac{s - 3}{(s + 3)^3}$

(c) $F(s) = \frac{1}{s^2(s^2 - 2s + 1)}$

(d) $F(s) = \frac{2s + 3}{(s + 3)(s^2 + 9)}$

2. Find $\mathcal{L}^{-1} \left\{ \frac{1}{(s - 1)^{5/2}} \right\}$. (Your answer should involve $\sqrt{\pi}$.)

3. Using the table of Laplace transforms and the Second Shifting Theorem, find the Laplace transform of

(a) $g(t) = (t - 3)^3 u_3(t)$

(b) $g(t) = \begin{cases} 0, & 0 \leq t < 2 \\ t^2, & 2 \leq t \end{cases}$

(c) $g(t) = \begin{cases} t, & 0 \leq t < 1 \\ 0, & 1 \leq t \end{cases}$