ECE 3337 Summer-3, 2016 Hebert, Homework 09, Due Thurs 7/14

Problem 1. Find the LaPlace transform of the following functions

(a) $x(t) = (1 - e^{-2t})\, u(t)$

(b) $x(t) = u(t) - u(t-10)$

(c) $x(t) = e^{-4t}\, u(t) - e^{-4(t-1)}\, u(t-1)$

Problem 2. (Problem 5-10 in your book – Ziemer) Find the inverse Laplace transforms.
Hint: if the roots are complex, factor the denominator into the form of entry 6, 7, or 13 of your LT table handout. If the order of the numerator s-polynomial is greater-than-or-equal-to the order of the denominator s-polynomial, apply long division to get a constant + a ratio of two s-polynomials, then do the inverse LT.

(a) $F(s) = \dfrac{s+10}{s^2+3s+2}$ (b) $F(s) = \dfrac{s+10}{s^2+8s+20}$ (c) $F(s) = \dfrac{s^2+5s+7}{s^2+5s+6}$

Problem 3. Find the LaPlace transforms of $f(t)$ below.

(a) $f(t) = e^{+3t}u(t-1)$ hint: factor all t's into (t-1)'s then apply the delay property, similar to FTs.

(b) $f(t) = \sin^2(t)\, u(t)$ hint: use a trig identity

Problem 4. Nilsson, eighth edition, Problem 12.42

12.42 Find $f(t)$ for each of the following functions.

a) $F(s) = \dfrac{10s^2 + 85s + 95}{s^2 + 6s + 5}$.

b) $F(s) = \dfrac{5(s^2 + 8s + 5)}{s^2 + 4s + 5}$.

c) $F(s) = \dfrac{s^2 + 25s + 150}{s + 20}$.