Differential Equations
Problem Set 10
The Laplace Transform: Introduction

1. Using the definition of the Laplace transform show that

$$\mathscr{L}\{\cos kt\} = \frac{s}{s^2 + k^2}$$

2. Use the linearity of the Laplace transform to show

   (a) $\mathscr{L}\{a + bt + ct^2\} = \frac{as^2 + bs + 2c}{s^3}$
   (b) $\mathscr{L}\{\cosh kt\} = \frac{s}{s^2 - k^2}$
   (c) $\mathscr{L}\{e^{at} - e^{bt}\} = \frac{a-b}{(s-a)(s-b)}$