Assignment 9

1. Find the Laplace transform of the following functions
   a. $a(t) = 2\delta(t) + 3 + 4u(t)$
   b. $b(t) = 5 - 5e^{-2t}(1 + 2t)$
   c. $c(t) = 10e^{-4t}\cos(20t + 36.9^0)$
   d. $d(t) = 1.5tu(t) - 1.5(t - 10)u(t - 10)$
   e. $e(t) = 1.5tu(t) - 1.5(t - 10)u(t - 10)$
   f. $f(t) = 1.5tu(t) - 1.5(t - 10)u(t - 10) - 15u(t - 10)$
   g. $g(t) = 1.5tu(t) - 1.5(t - 10)u(t - 10) - 3.0(t - 15)u(t - 15)$
   h. $h(t) = (t + 2)u(t - 3)$
   i. $j(t) = 6e^{-2t+11}u(t - 5)$

2. If $f(t)$ satisfies the following equation, find the Laplace transform $F(s) = \mathcal{L}\{f(t)\}$.
$$3f''(t) + 10f'(t) + 5f(t) = e^{-2t}\sin(t)$$

3. Show that
$$\mathcal{L}\{f(at)\} = \frac{1}{a}F\left(\frac{s}{a}\right)$$