EE202 Homework 4

(1) Find Laplace transform of each of the following functions:

(a) \( f(t) = \sin \omega t \)
(b) \( f(t) = \cos \omega t \)
(c) \( f(t) = e^{-at} \)
(d) \( f(t) = te^{-at} \)
(e) \( f(t) = 5 \sin \omega t + 8 \cos \omega t \)
(f) \( f(t) = 10 \sin(\omega t + \pi / 4) \)
(g) \( f(t) = t \)
(h) \( f(t) = t^2 \)

where \( a \) and \( \omega \) are positive constants.

(2) Find the inverse Laplace transform of each of the following functions:

(a) \( F(s) = \frac{1}{s} \)
(b) \( F(s) = \frac{1}{s^2} \)
(c) \( F(s) = \frac{1}{(s + a)^2} \)
(d) \( F(s) = \frac{1}{s + a} \)
(e) \( F(s) = \frac{\omega}{s^2 + \omega^2} \)
(f) \( F(s) = \frac{s}{s^2 + \omega^2} \)
(g) \( F(s) = \frac{\omega}{(s + a)^2 + \omega^2} \)
(h) \( F(s) = \frac{s + a}{(s + a)^2 + \omega^2} \)

where \( a \) and \( \omega \) are positive constants.