# Tutorial 1

## Problem 1

**PROBLEM:** Find the inverse Laplace transform of $F(s) = 10/[s(s+2)(s+3)^2]$.

## Problem 2

**PROBLEM:** Find the ramp response for a system whose transfer function is

$$G(s) = \frac{s}{(s+4)(s+8)}$$

## Problem 3

**PROBLEM:** Find the transfer function, $G(s) = V_o(s)/V_i(s)$, for each operational amplifier circuit shown in Figure P2.8. [Section: 2.4]



(a)

(b)

## Problem 4

Solve the following differential equations

a. $\dfrac{dx}{dt} + 7x = 5 \cos 2t$

b. $\dfrac{d^2x}{dt^2} + 6\dfrac{dx}{dt} + 8x = 5 \sin 3t$

c. $\dfrac{d^2x}{dt^2} + 8\dfrac{dx}{dt} + 25x = 10u(t)$

Assuming that the initial conditions for each part are as follows:

(a) x(0) = 4, x'(0) = -4;

(b) x(0)= 4, x'(0) = 1;

(c) x(0) = 2, x'(0) = 3

## Problem 5

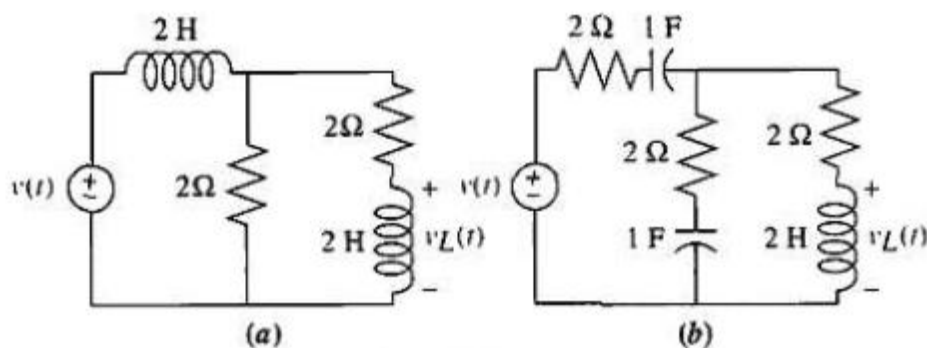Find the transfer function, $G(s) = V_L(s)/V(s)$, for each network shown in Figure P2.4. [Section: 2.4]



(a)                                    (b)

FIGURE P2.4