

Sections: 7.4

1. Determine the inverse Laplace transform of the following.

(a) $F(s) = \frac{4}{s+3}$

(d) $J(s) = \frac{2}{(s-3)^4}$

(b) $G(s) = \frac{3}{2s+1}$

(e) $K(s) = \frac{2}{s^2+3}$

(c) $H(s) = \frac{2}{3-s}$

(f) $M(s) = \frac{2s}{s^2+3}$

(g) $N(s) = \frac{2s+2}{s^2+3}$

(h) $P(s) = \frac{6s}{s^2+4s+6}$

(i) $Q(s) = \frac{4s+2}{s^3+2s^2}$

2. Consider the initial value problem

$$y'' + 4y = 8t - 4, \quad y(0) = 1, y'(0) = 0. \quad (1)$$

(a) Applying the Laplace transform to the initial value problem (1) gives the following

$$[s^2Y(s) - s] + 4Y(s) = \frac{8}{s^2} - \frac{4}{s}. \quad (2)$$

Solve equation (2) above for $Y(s)$ and then determine $y(t) = \mathcal{L}^{-1}\{Y(s)\}$ which is the solution to the initial value problem.

(b) Use methods from Chapter 4 to solve the the initial value problem (1).