

problem 6

HW#9 - 6

b)  $F(s) = 6 \frac{s+2}{s(s+1)(s+4)}$   $s=0, -1, -4$

$$\frac{s+2}{s(s+1)(s+4)} = \frac{A}{s} + \frac{B}{s+1} + \frac{C}{s+4}$$

$$s+2 = A(s+1)(s+4) + Bs(s+4) + Cs(s+1)$$

$$s=0$$

$$2 = A(0+1)(0+4) + 0 + 0$$

$$2 = 4A \Rightarrow A = 1/2$$

$$s=-1$$

$$-1+2 = 0 + B(-1)(-1+4) + 0$$

$$1 = -3B \Rightarrow B = -1/3$$

$$s=-4$$

$$-4+2 = 0 + 0 + C(-4)(-4+1)$$

$$-2 = C(-12) \Rightarrow C = -1/6$$

$$F(s) = 6 \left( \frac{1/2}{s} + \frac{-1/3}{s+1} + \frac{-1/6}{s+4} \right) \Rightarrow F(s) = \frac{3}{s} - \frac{2}{s+1} - \frac{1}{s+4}$$

$$L^{-1}(f(s)) = 3L^{-1}\left[\frac{1}{s}\right] - 2L^{-1}\left[\frac{1}{s+1}\right] - 1L^{-1}\left[\frac{1}{s+4}\right]$$

$$f(t) = 3 - 2e^{-t} - e^{-4t}$$