

**13.26** Given the following functions  $F(s)$ , find  $f(t)$ .

$$(a) F(s) = \frac{s + 3}{(s + 2)^2}$$

$$(b) F(s) = \frac{s + 6}{s(s + 2)^2}$$

SOLUTION:

$$a) F(s) = \frac{k_1}{(s+2)^2} + \frac{k_2}{s+2} \quad k_1 = 1$$

$$\text{let } s = -1, F(-1) = 2 = 1 + k_2 \Rightarrow k_2 = 1$$

$$F(s) = \frac{1}{(s+2)^2} + \frac{1}{s+2} \Rightarrow f(t) = [te^{-2t} + e^{-2t}]u(t)$$

$$b) F(s) = \frac{k_1}{s} + \frac{k_2}{(s+2)^2} + \frac{k_3}{s+2} \quad k_1 = \frac{3}{2} \quad k_2 = \frac{4}{-2} = -2$$

$$\text{let } s = -1, F(-1) = \frac{5}{-1} = -5 = -\frac{3}{2} - 2 + k_3 \Rightarrow k_3 = -3/2$$

$$F(s) = \frac{3/2}{s} - \frac{2}{(s+2)^2} - \frac{3/2}{s+2} \Rightarrow f(t) = [3/2 - 2te^{-2t} - \frac{3}{2}e^{-2t}]u(t)$$