4.04*

a) $\dfrac{s}{s^2 + 6s + 8} = \dfrac{s}{(s+4)(s+2)} = \dfrac{A}{s+4} + \dfrac{B}{s+2} =$

$= \dfrac{2}{s+4} - \dfrac{1}{s+2}$

$2e^{-4t}\theta(t) \;\rightarrow\; \dfrac{2}{s+4}$

$-e^{-2t}\theta(t) \;\rightarrow\; -\dfrac{1}{s+2}$

$\left.\right\}$ $\underline{\left(2e^{-4t} - e^{-2t}\right)\theta(t)}$

$s = A(s-2) + B(s-4)$

$\begin{cases} A + B = 1 \;\rightarrow\; A = 1 - B \\ -2A - 4B = 0 \end{cases}$

$-2 + 2B - 4B = 0 \;\Leftrightarrow\; -2B = 2 \qquad B = -1$

$\qquad\qquad\qquad\qquad\qquad\qquad A = 2$

b) $\dfrac{s}{s^2 + 6s + 10} = \dfrac{s}{(s+3)^2 + 1} = \dfrac{s+3}{(s+3)^2 + 1} - \dfrac{3}{(s+3)^2 + 1}$

$e^{-3t}(\cos t)\,\theta(t) \;\rightarrow\; \dfrac{s+3}{(s+3)^2 + 1}$

$-3e^{-3t}(\sin t)\,\theta(t) \;\rightarrow\; -\dfrac{3}{(s+3)^2 + 1}$

$\underline{\left(\cos t - 3\sin t\right)e^{-3t}\,\theta(t)}$