Amazingly the answer in the back of the book for #7 p. 247 is correct. Here are some hints.

$$Y(s) = \frac{10}{s\left((s+1)^2+9\right)} - \frac{10e^{-4s}}{s\left((s+1)^2+9\right)} - \frac{10e^{-5s}}{(s+1)^2+9} + \frac{s}{(s+1)^2+9} + \frac{3}{(s+1)^2+9}$$

$$\mathcal{L}^{-1}\left(\frac{10}{s\left((s+1)^2+9\right)}\right) = \frac{10}{3}\int_0^t e^{-\tau}\sin 3\tau\, d\tau = \frac{e^{-t}}{3}\left(-\sin 3t - 3\cos t\right)+1$$

$$\mathcal{L}^{-1}\left(\frac{10}{s\left((s+1)^2+9\right)}\right) = \frac{10}{3}\int_0^t u(\tau-4)e^{-\tau+4}\sin(3\tau-12)\,d\tau$$

$$= 10/3\; u(t-4)\int_4^t e^{-\tau+4}\sin(3\tau-12)\,d\tau$$

$$= 10/3\; u(t-4)\int_0^{t-4} e^{-x}\sin 3x\,dx$$

$$= \cdots\cdots$$

$$\mathcal{L}^{-1}\left(\frac{10e^{-5s}}{(s+1)^2+9}\right) = 10/3\, e^{-t+5}\, u(t-5)\sin(3t-15)$$

$$\mathcal{L}^{-1}\left(\frac{s+1}{(s+1)^2+9}\right) = \cdots$$

$$\mathcal{L}^{-1}\left(\frac{2}{(s+1)^2+9}\right) = \cdots\cdot$$