HOMEWORK #11 (Chapter 4 The Laplace Transform)

In problem 1 and 2, use theorem 4.3 to find the given inverse transform.

(1) $\mathcal{L}^{-1}\{\frac{s}{(s+2)(s^2+4)}\}$ (Exercises 4.2 problem 26)

Ans: $\mathcal{L}^{-1}\{\frac{s}{(s+2)(s^2+4)}\}=\mathcal{L}^{-1}\{\frac{1}{4}\frac{s}{(s^2+4)}+\frac{1}{4}\frac{2}{(s^2+4)}-\frac{1}{4}\frac{1}{(s+2)}\}=\frac{1}{4}\cos 2t+\frac{1}{4}\sin 2t-\frac{1}{4}e^{-2t}$

(2) $\mathcal{L}^{-1}\{\frac{6s+3}{(s^4+5s^2+4)}\}$ (Exercises 4.2 problem 30)

Ans: $\mathcal{L}^{-1}\{\frac{6s+3}{(s^4+5s^2+4)}\}=\mathcal{L}^{-1}\{\frac{2s}{(s^2+1)}+\frac{1}{(s^2+1)}-\frac{2s}{(s^2+4)}-\frac{1}{2}\frac{2}{(s^2+4)}\}$

$$=2\cos t+\sin t-2\cos 2t-\frac{1}{2}\sin 2t$$