Problem S10 (Signals and Systems)

This problem provides lots of practice using partial fraction expansions to determine inverse Laplace transforms. Please use the coverup method — it really is superior to other methods, and more reliable. Also, please check your answer, that is, verify that your expansion really is equivalent to the $G(s)$ given.

For each of the following Laplace transforms, find the inverse Laplace transform.

1. $G(s) = \dfrac{3s^2 + 3s - 10}{s^2 - 4}, \quad \mathrm{Re}[s] > 2$

2. $G(s) = \dfrac{6s^2 + 26s + 26}{(s+1)(s+2)(s+3)}, \quad \mathrm{Re}[s] > -1$

3. $G(s) = \dfrac{4s^2 + 11s + 9}{(s+1)^2(s+2)}, \quad \mathrm{Re}[s] > -1$

4. $G(s) = \dfrac{4s^3 + 11s^2 + 5s + 2}{s^2(s+1)^2}, \quad \mathrm{Re}[s] > 0$

5. $G(s) = \dfrac{s^3 + 3s^2 + 9s + 12}{(s^2+4)\,(s^2+9)}, \quad \mathrm{Re}[s] > 0$