Problem S14 (Signals and Systems)

For each of the following Laplace transforms, find the inverse Laplace transform. Note that you can use the results of Problem S10 to help with the partial fraction expansions, but you will need to use the region of convergence to determine the inverse transform.

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

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

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

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

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

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

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

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

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