1. Řešit pomocí konvoluce $\frac{1}{(s-1)(s-2)}$.

$$L_{-1}\left(\frac{1}{s-1}\right) = e^t$$
$$L_{-2}\left(\frac{1}{s-2}\right) = e^{2t}$$

$$\begin{aligned}(f*g)(t) &= \int_0^t e^{t-y}e^{2y}\mathrm{d}y = \int_0^t e^{t-y+2y}\mathrm{d}y \\ &= \int_0^t e^{t+y}\mathrm{d}y = \int_0^t e^t e^y \mathrm{d}y \\ &= \left[e^t e^y\right]_0^t = e^t e^t - e^t e^0 \\ &= e^{2t} - e^t = e^t(e^t - 1)\end{aligned}$$

2. Řešit pomocí residuí $\frac{2s+3}{s^2+4s+3}$.

$$\frac{2s+3}{s^2+4s+3} = \frac{2s+3}{(s+1)(s+3)}$$

Póly:

$$z_1 = -1$$
$$z_2 = -3$$

Residua:

$$res_{-1}\frac{2s+3}{s^2+4s+3}e^{st} = \lim_{s\to -1}\frac{2s+3}{s+3}e^{st} = \frac{1}{2}e^{-t}$$
$$res_{-3}\frac{2s+3}{s^2+4s+3}e^{st} = \lim_{s\to -3}\frac{2s+3}{s+1}e^{st} = \frac{-3}{-2}e^{-3t} = \frac{3}{2}e^{-3t}$$

$$L_{-1}\left(\frac{2s+3}{s^2+4s+3}\right)(t) = \frac{1}{2}e^{-t} + \frac{3}{2}e^{-3t}$$