From the table of LT, one has (shifting 2)

$$\mathscr{L}^{-1}\left\{\mathrm{e}^{-Ts}F(s)\right\}(t) = f(t-T)\theta(t-T), \quad \text{where} \quad F(s) = \mathscr{L}\left\{f(t)\right\}(s)$$

and

$$\mathscr{L}\left\{\mathrm{e}^{-at}\right\}(s) = \frac{1}{s+a}.$$

Hence,

$$\mathscr{L}^{-1}\left\{\mathrm{e}^{-2s}\frac{1}{s+1}\right\}(t) = f(t-2)\theta(t-2)$$

using shifting 2 with $F(s) = \frac{1}{s+1}$. Now, using the above with $a = 1$, one has $f(t) = \mathrm{e}^{-t}$ and then

$$\mathscr{L}^{-1}\left\{\mathrm{e}^{-2s}\frac{1}{s+1}\right\}(t) = f(t-2)\theta(t-2) = \mathrm{e}^{-(t-2)}\theta(t-2).$$