7.3.81.

a)

$$L\{(g(t-a))U(t-a)\} = e^{-as}L\{g(t)\}$$

$$L\{(2t+1)U(t-1)\} = L\{(2(t-1)+3)U(t-1)\} =$$

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

Testa med: $L\{(g(t))U(t-a)\} = e^{-as}L\{g(t+a)\}.$

$$L\{(2t+1)U(t-1)\} = e^{-1s}L\{2(t+1)+1\} = e^{-s}L\{2t+3\}$$

b)

$$L\left\{e^{t}U(t-5)\right\}=L\left\{e^{5}e^{t-5}U(t-5)\right\}=$$

$$=e^{5}e^{-5s}L\left\{e^{t}\right\}=e^{5}e^{-5s}\frac{1}{s+5}$$

$$L\left\{e^{t}U(t-5)\right\}=e^{-5s}L\left\{e^{t+5}\right\}=e^{-5s}e^{5}L\left\{e^{t}\right\}$$

c)

$$L\{\cos t\,U(t-\pi)\} = L\{-\cos(t-\pi)\,U(t-\pi)\} =$$

$$= -e^{-\pi s} L\{\cos t\} = -e^{-\pi s}\,\frac{s}{s^2+1}$$

$$L\{\cos t\,U(t-\pi)\} = e^{-\pi s} L\{\cos(t+\pi)\} =$$

$$= -e^{-\pi s} L\{\cos t\}$$

d)

$$L\{(t^2 - 3t)U(t-2)\} = L\{((t-2)^2 + t - 2 - 2)U(t-2)\} =$$

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

$$L\{(t^2 - 3t)U(t-2)\} = e^{-2s}L\{((t+2)^2 - 3(t+2)\} =$$

$$= e^{-2s}L\{(t^2 + t - 2)\}$$