# 9.2.

## a)

$$\int_{\gamma} ydx - dy$$

$$\gamma: \quad \mathbf{r} = (0,1) + t\{(1,-1) - (0,1)\} = (t, 1-2t) \qquad t: 0 \to 1$$

$$\gamma: \begin{cases} x = t \\ y = 1-2t \end{cases} \quad \begin{cases} dx = dt \\ dy = -2\,dt \end{cases} \qquad t: 0 \to 1$$

$$\int_{\gamma} ydx - dy = \int_{t=0}^{1} \{(1-2t)\ 1 - (-2)\}\,dt = \int_{t=0}^{1} (3-2t)dt = 3-1 = 2$$

b)

$$\gamma = \gamma_1 \quad \gamma_2$$

$$\gamma_1 : \begin{cases} x = t & dx = dt \\ y = 1 & dy = 0 \end{cases} \qquad t : 0 \to 1$$

$$\gamma_2 : \begin{cases} x = 1 & dx = 0 \\ y = t & dy = dt \end{cases} \qquad t : 1 \to -1$$

$$\int_{\gamma} ydx - dy = \int_{\gamma_1} ydx - dy + \int_{\gamma_2} ydx - dy$$

$$\int_{\gamma} ydx - dy = \int_{t=0}^{1} \{1 \; 1 - 0)\} dt + \int_{t=1}^{-1} (t \;\; 0 - 1) dt$$

$$\int_{\gamma} ydx - dy = 1 - (-2) = 3$$

SVAR: Linjeintegralen är lika med a) 2 b) 3.