$\begin{cases} \ln\left(y^2 - x\right) = 0 \\ x - y - 1 = 0 \end{cases}$. $\begin{cases} y^2 - x = 1 \\ x = y + 1 \end{cases}$. $y^2 - y - 2 = 0$. $\begin{cases} x_1 = 0 \\ y_1 = -1 \end{cases}$, $\begin{cases} x_2 = 3 \\ y_2 = 2 \end{cases}$.

1. $A_1 = (0; -1)$. $y = u - 1$. $\dfrac{d}{dt}\begin{pmatrix} x(t) \\ u(t) \end{pmatrix} = \begin{pmatrix} \ln\left((u-1)^2 - x\right) \\ x - u \end{pmatrix} = \begin{pmatrix} \ln\left(1 - 2u + u^2 - x\right) \\ x - u \end{pmatrix} =$

$$= \begin{pmatrix} -2u + u^2 - x + o(x) + o(u) \\ x - u \end{pmatrix} = \begin{pmatrix} -2u - x + o\left(\sqrt{x^2 + u^2}\right) \\ x - u \end{pmatrix} = \begin{pmatrix} -1 & -2 \\ 1 & -1 \end{pmatrix}\begin{pmatrix} x \\ u \end{pmatrix} + \Psi.$$

$(\lambda + 1)^2 + 2 = 0$. $\lambda^2 + 2\lambda + 3 = 0$. $D < 0$, $\mathrm{Re}(\lambda) = -1$, точка равновесия устойчива.

2. $A_2 = (3; 2)$. $\begin{cases} x = u + 3 \\ y = 2 + v \end{cases}$. $\dfrac{d}{dt}\begin{pmatrix} u(t) \\ v(t) \end{pmatrix} = \begin{pmatrix} \ln\left((v+2)^2 - u - 3\right) \\ u + 3 - v - 2 - 1 \end{pmatrix} = \begin{pmatrix} \ln\left(1 + 4v + v^2 - u\right) \\ u - v \end{pmatrix}$

$$= \begin{pmatrix} 4v + v^2 - u + o(u) + o(v) \\ u - v \end{pmatrix} = \begin{pmatrix} 4v - u + o\left(\sqrt{u^2 + v^2}\right) \\ u - v \end{pmatrix} = \begin{pmatrix} -1 & 4 \\ 1 & -1 \end{pmatrix}\begin{pmatrix} u \\ v \end{pmatrix} + \Psi.$$

$(\lambda + 1)^2 - 4 = 0$. $\lambda_1 = -3$, $\lambda_2 = 1$, точка неустойчива.