$0 \stackrel{!}{=} 3x^2 + 12y^2 - 24y \qquad x_1 = 0 \quad y_1 = 1$

$0 = 3 \cdot 0^2 + 12y^2 - 24y$

$0 = 12y^2 - 24y = y(12y - 24) \rightsquigarrow y_{S1} = 0$

$y_{S2} = 2$

$x_{S1} = 0 \quad y_{S1} = 0$

$x_{S2} = 0 \quad y_{S2} = 2$

$0 = 3x^2 + 12 \cdot 1^2 - 24 \cdot 1$

$0 = 3x^2 - 12$

$4 = x^2$

$x_{S3,4} = \pm 2$

$x_{S3} = 2 \quad y_{S3} = 1$

$x_{S4} = -2 \quad y_{S4} = 1$

$$H = \begin{pmatrix} z_{xx} & z_{xy} \\ z_{yx} & z_{yy} \end{pmatrix} = \begin{pmatrix} 6y - 6 & 6x \\ 6x & 24y - 24 \end{pmatrix}$$

$$\det(H) = (6y-6)(24y-24) - (6x)^2$$

$\det(H_1) = (6 \cdot 0 - 6)(24 \cdot 0 - 24) - (6 \cdot 0)^2 = 144 \rightsquigarrow EP$

$\det(H_2) = (6 \cdot 2 - 6)(24 \cdot 2 - 24) - (6 \cdot 0)^2 = 144 \rightsquigarrow EP$

$\det(H_3) = (6 \cdot 1 - 6)(24 \cdot 1 - 24) - (6 \cdot 2)^2 = -144 \rightsquigarrow SP$

$\det(H_4) = (6 \cdot 1 - 6)(24 \cdot 1 - 24) - (6 \cdot (-2))^2 = -144 \rightsquigarrow SP$