Step-1

We get

$$\begin{aligned}(y,1-y)A &= (y,1-y)\begin{bmatrix}1 & 0 & -1\\ -2 & -1 & 2\end{bmatrix}\\ &= \left(1y-2(1-y),-1(1-y),-y+2(1-y)\right)\\ &= (-y-2,y-1,2-3y)\end{aligned}$$

Step-2

Equating $-y-2$ and $y-1$, we get $y=-\frac{1}{2}$. This is impossible, because y should be either positive or zero. Thus, we discard this case.

Equating $y-1$ and $2-3y$, we get $y=\frac{3}{4}$. For this value of y, we get

$$\begin{aligned}(-y-2,y-1,2-3y) &= \left(-\frac{3}{4}-2,\frac{3}{4}-1,2-3\left(\frac{3}{4}\right)\right)\\ &= \left(-\frac{11}{4},-\frac{1}{4},-\frac{1}{4}\right)\end{aligned}$$

The maximum value is $-\frac{1}{4}$.

Step-3

Equating $-y-2$ and $2-3y$, we get $y=\frac{1}{2}$. For this value of y, we get

$$\begin{aligned}(-y-2,y-1,2-3y) &= \left(-\frac{1}{2}-2,\frac{1}{2}-1,2-3\left(\frac{1}{2}\right)\right)\\ &= \left(-\frac{5}{2},-\frac{1}{2},\frac{1}{2}\right)\end{aligned}$$

The maximum value is $\frac{1}{2}$.

Step-4

Out of $\frac{1}{2}$ and $-\frac{1}{4}$, the least value is $-\frac{1}{4}$. Therefore, the best strategy of *Y* will have $y=\frac{3}{4}$.

Thus, we have $y^* = \frac{3}{4}$.