

1)

$$\begin{pmatrix} 1 & 0 & -1 \end{pmatrix} \begin{pmatrix} 1 & 2 \\ 2 & 1 \\ 1 & 1 \end{pmatrix} = \begin{pmatrix} 0 & 1 \end{pmatrix}$$

2)

$$X = \begin{pmatrix} 3 & 3 \\ 2 & 3 \\ 0 & -3 \end{pmatrix} \begin{pmatrix} 1 & 0 \\ 2 & 3 \end{pmatrix}^{-1} = \begin{pmatrix} 1 & 1 \\ 0 & 1 \\ 2 & -1 \end{pmatrix}$$

3)

$$A^2 = \begin{pmatrix} x^2 + 2 & x + 3 \\ 2x + 6 & 11 \end{pmatrix} = \begin{pmatrix} 6 & 1 \\ 2 & 11 \end{pmatrix}$$

$$\begin{cases} x^2 + 2 = 6 \\ x + 3 = 1 \\ 2x + 6 = 2 \end{cases}$$

On en déduit que $x = -2$.