

Solution: 3.1907

$$|A - \lambda I| = 0$$

$$0 = \left| \begin{pmatrix} 1 - \lambda & 1 \\ 1 & -1 - \lambda \end{pmatrix} \right| = (1 - \lambda)(-1 - \lambda) - 1 = \lambda^2 - 2$$

$$\lambda = \pm\sqrt{2}$$

for $\lambda_1 = \sqrt{2}$ we get: $v_1 = \begin{pmatrix} 1 \\ \frac{1}{\sqrt{2}-1} \end{pmatrix}$.

for $\lambda_2 = -\sqrt{2}$ we get: $v_2 = \begin{pmatrix} 1 \\ -\frac{1}{\sqrt{2}+1} \end{pmatrix}$.