

# Quiz 6

Name: \_\_\_\_\_ Solutions \_\_\_\_\_

Score: \_\_\_\_\_

1. Find all the eigenvalues  $\lambda$  of the matrix  $A$ . You do not need to find eigenvectors.

$$A = \begin{bmatrix} 4 & -6 \\ 1 & -1 \end{bmatrix}$$

Eigenvalues and vectors:

$$1 : \begin{bmatrix} -2 \\ -1 \end{bmatrix} \quad 2 : \begin{bmatrix} 3 \\ 1 \end{bmatrix}$$

$$\lambda = \underline{\hspace{2cm}}, \quad \underline{\hspace{2cm}}.$$

2. Which of the vectors is an eigenvector of  $A$ ? Circle your answer.

$$A = \begin{bmatrix} -1 & 1 \\ -12 & 6 \end{bmatrix}$$

$$3 : \begin{bmatrix} 1 \\ 4 \end{bmatrix} \quad 2 : \begin{bmatrix} 1 \\ 3 \end{bmatrix}$$

$$(i) \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

$$(ii) \begin{bmatrix} 2 \\ 4 \end{bmatrix}$$

$$(iii) \begin{bmatrix} -1 \\ -1 \end{bmatrix}$$

$$(iv) \begin{bmatrix} 1 \\ 4 \end{bmatrix}$$

3. Find the change-of-basis matrix  $P_{C \leftarrow B}$  that rewrites a vector  $[\vec{x}]_B$  in  $B$  coordinates in terms of  $C$  coordinates  $[\vec{x}]_C$ :

$$B = \begin{bmatrix} -5 \\ -10 \end{bmatrix}, \quad \begin{bmatrix} -3 \\ -7 \end{bmatrix},$$
$$C = \begin{bmatrix} 3 \\ 2 \end{bmatrix}, \quad \begin{bmatrix} 1 \\ -1 \end{bmatrix}, \quad .$$

Solution:

$$P_{C \leftarrow B} = \begin{bmatrix} -3 & -2 \\ 4 & 3 \end{bmatrix}$$

$$P_{C \leftarrow B} = \begin{bmatrix} \underline{\hspace{1cm}} & \underline{\hspace{1cm}} \\ \underline{\hspace{1cm}} & \underline{\hspace{1cm}} \end{bmatrix}$$