

1.(1 pt) Calculate the eigenvalues of this matrix:

[Note- you'll probably want to use a graphing calculator to estimate the roots of the polynomial which defines the eigenvalues. You can use the web version at [xFunctions](#)]

$$A = \begin{pmatrix} 5 & 5 \\ 0 & 10 \end{pmatrix}$$

smaller eigenvalue = _____
 associated, eigenvector = (_____ , _____)
 larger eigenvalue = _____
 associated, eigenvector = (_____ , _____)

2.(1 pt) Find the characteristic polynomial of the matrix

$$A = \begin{bmatrix} -8 & 1 \\ -7 & 6 \end{bmatrix}$$

$p(x) =$ _____

3.(1 pt) Find the characteristic polynomial of the matrix

$$A = \begin{bmatrix} -4 & -4 & 0 \\ 0 & -4 & 4 \\ -5 & 5 & 0 \end{bmatrix}$$

$p(x) =$ _____

4.(1 pt) Find the eigenvalues of the matrix

$$A = \begin{bmatrix} -2 & 2 \\ -1 & -5 \end{bmatrix}$$

The smaller eigenvalue is $\lambda_1 =$ _____

The bigger eigenvalue is $\lambda_2 =$ _____

5.(1 pt) The matrix

$$C = \begin{bmatrix} 3 & 0 & 0 \\ -8 & -1 & 0 \\ -4 & 4 & -3 \end{bmatrix}$$

has three distinct eigenvalues, $\lambda_1 < \lambda_2 < \lambda_3$, where $\lambda_1 =$ _____ ,
 $\lambda_2 =$ _____ , $\lambda_3 =$ _____ .

6.(1 pt) The matrix

$$C = \begin{bmatrix} -6 & 0 & -2 \\ -6 & -4 & -6 \\ 4 & 0 & 0 \end{bmatrix}$$

has two distinct eigenvalues, $\lambda_1 < \lambda_2$:
 $\lambda_1 =$ _____ has multiplicity _____ , and
 $\lambda_2 =$ _____ has multiplicity _____ .

7.(1 pt) The matrix

$$C = \begin{bmatrix} 5 & 8 & 12 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{bmatrix}$$

has two distinct eigenvalues, $\lambda_1 < \lambda_2$:
 $\lambda_1 =$ _____ has multiplicity _____ . The dimension of the corresponding eigenspace is _____ .
 $\lambda_2 =$ _____ has multiplicity _____ . The dimension of the corresponding eigenspace is _____ .

Is the matrix C diagonalizable? (enter YES or NO) _____

8.(1 pt) The matrix

$$A = \begin{bmatrix} -1 & -9 \\ 1 & 1 \end{bmatrix}$$

has complex eigenvalues, $\lambda_{1,2} = a \pm bi$ where $a =$ _____ and
 $b =$ _____ .

9.(1 pt) Calculate the eigenvalues of this matrix:

[Note- you'll probably want to use a graphing calculator to estimate the roots of the polynomial which defines the eigenvalues. You can use the web version at [xFunctions](#) . Also, You can use this [row reduction tool](#) to help with the calculations.]

$$A = \begin{pmatrix} -4 & 2 & -2 \\ 4 & 0 & 4 \\ 8 & -2 & 6 \end{pmatrix}$$

The eigenvalues are $\lambda_1 < \lambda_2 < \lambda_3$, where
 $\lambda_1 =$ _____
 associated eigenvector = (_____ , _____ , _____)
 $\lambda_2 =$ _____
 associated eigenvector = (_____ , _____ , _____)
 $\lambda_3 =$ _____
 associated eigenvector = (_____ , _____ , _____)