1.(1 pt) You'll need to use the formatted text mode in order to do this problem: click the "formatted text" button on the bottom of the page and then click "submit answer".

Write the matrix of the quadratic form

$$Q(x) = -5x_1^2 - 7x_2^2 - 4x_3^2 + 6x_1x_2 + 2x_1x_3 + 3x_2x_3$$

$$A = \begin{bmatrix} \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \\ \_\_ & \_\_ & \_\_ \end{bmatrix}$$

2.(1 pt) Find the eigenvalues of the matrix

$$A = \begin{bmatrix} 6.2 & -5.6 \\ -5.6 & -2.2 \end{bmatrix}.$$

The smaller eigenvalue is $\lambda_1 =$ _____ ,
and the bigger eigenvalue is $\lambda_2 =$ _____ .

Classify the quadratic form $Q(x) = x^T Ax$:

- A. $Q(x)$ is positive semidefinite
- B. $Q(x)$ is negative definite
- C. $Q(x)$ is negative semidefinite
- D. $Q(x)$ is indefinite
- E. $Q(x)$ is positive definite

3.(1 pt) The matrix

$$A = \begin{bmatrix} -4.8 & 0 & 0.6 \\ 0 & -2 & 0 \\ 0.6 & 0 & -3.2 \end{bmatrix}$$

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

Classify the quadratic form $Q(x) = x^T Ax$:

- A. $Q(x)$ is positive definite
- B. $Q(x)$ is indefinite
- C. $Q(x)$ is negative definite
- D. $Q(x)$ is negative semidefinite
- E. $Q(x)$ is positive semidefinite