Section 3.12. In #16, refer to Figure 12.1. The left $k$ becomes $4k$, the center $k$ becomes $2k$, and the right $k$ remains $k$. If we rename the coordinates $x, y$ as $x_1, x_2$ as we did in class, the vector equation of motion for the coupled mass-spring system is

$$m \frac{d^2}{dt^2} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = k \begin{pmatrix} -6 & 2 \\ 2 & -3 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}. $$

Find the normal frequencies and normal modes of vibration. Describe in words the normal modes of vibration.