**Modes of oscillation**

Examine the masses $M$ and springs $K$ shown in the figure. The masses move in the horizontal direction only (1-dimension) and the springs are attached to fixed blocks at the ends at $x = 0$ and $x = L = 3a$.

1. Write Newton’s coupled equations of motion for the masses and solve for the modes and their frequencies. Hint: the solutions will be symmetric and/or antisymmetric.

2. Compare your modes with the functions $x_j = \sin (kaj)$ and compare the frequencies with $\omega(k) = 2\sqrt{K/m} \sin (ka/2)$. What are the values of $k$ for each mode?