Task 3

Prepare a mathematical pendulum motion simulation by solving the following equations describing the pendulum motion

$$\begin{cases} \frac{d\alpha}{dt} = \omega \\ \frac{d\omega}{dt} = \varepsilon \quad \varepsilon = \frac{a}{r} \end{cases}$$

$$a = g\ sin(\alpha)$$

$$\varepsilon = \frac{g}{r}\sin(\alpha)$$

Solve equations using the improved Euler method and RK4 method. Prepare energy graphs for potential, kinetic and total energy. Compare the results