Static equilibrium and torque physics problem:

You happen to have a massless rod of length ℓ with two masses, m₁ and m₂, attached to either side of the rod and a pivot. You’d like to place the rod and masses on the pivot in such a way that the rod remains stationary after you let go. What distance ℓ₁ from the left end of the rod should you place on the pivot? See Figure. Express your answer in terms of m₁, m₂, and ℓ.

Learning Objectives:
Understand torque and static equilibrium. Practice applying these principles to a very simple problem.