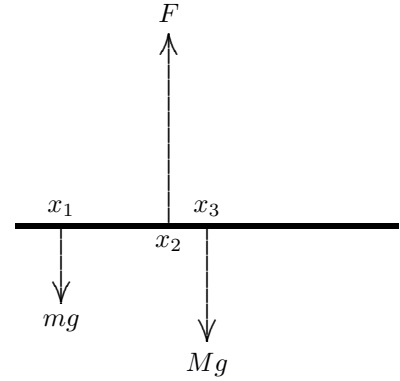


11.

The x axis is along the meter stick, with the origin at the zero position on the scale. The forces acting on it are shown on the diagram to the right. The nickels are at $x = x_1 = 0.120$ m, and m is their total mass. The knife edge is at $x = x_2 = 0.455$ m and exerts force \vec{F} . The mass of the meter stick is M , and the force of gravity acts at the center of the stick, $x = x_3 = 0.500$ m. Since the meter stick is in equilibrium, the sum of the torques about x_2 must vanish: $Mg(x_3 - x_2) - mg(x_2 - x_1) = 0$. Thus,



$$M = \frac{x_2 - x_1}{x_3 - x_2} m = \left(\frac{0.455 \text{ m} - 0.120 \text{ m}}{0.500 \text{ m} - 0.455 \text{ m}} \right) (10.0 \text{ g}) = 74 \text{ g} .$$