A 60 kg mass and a 20 kg mass are separated by 10 m. At what point on a line joining these charges will another mass experience zero resultant force?

Solution

$$m_1 = 60\ kg, m_2 = 20\ kg$$

$$F_{20} = F_{60} \rightarrow \frac{m\ m_1}{x^2} = \frac{m\ m_2}{(10-x)^2} \rightarrow\ x^2 m_2 =\ m_1(10-x)^2 \rightarrow x = \sqrt{\frac{60}{20}}\ (10-x)$$

$$x = 1.732(10-x) \rightarrow x = 17.32 - 1.732x \rightarrow x = \frac{17.32}{2.732} = 6.34$$

Answer: x=6.34m from the 60-kg mass.