Answer on Question #70927, Physics / Other

Question A boat of mass 80kg is floating on still water a dog of mass 20kg on the boat is at a distance of 10m from the the shore the dog moves on the boat by a distance of 2m towards the shore the distance of the dog from the shore is

Solution The center of mass of the system boat+dog must be immovable. Hence, we can write:
$$m_d \Delta l_d = m_b \Delta_b$$

where Δl_d is change in distance for dog and Δl_b the one for boat. We also know that
$$\Delta l_d + \Delta l_b = 2$$

From this we find that Δl_d is

$$\Delta l_d + \Delta l_d \frac{m_d}{m_b} = 2$$

$$\Delta l_d + \Delta l_d (1 + \frac{m_d}{m_b}) = 2$$

$$\Delta l_d = \frac{2}{(1 + \frac{m_d}{m_b})} = \frac{2}{(1 + \frac{20}{80})} = 1.6$$

So the answer is 10-1.6 = 8.4 m.