The center of mass of an object or a system is the point where the object or system could be balanced by a pivot or a string.

The center of mass is also the point upon which one can consider all of the force of gravity as acting upon.

$CM = (m_1x_1 + m_2x_2 + \ldots)/(M_{total})$

CM = the displacement of the center of mass from the x=0 reference point

m_1 = mass 1

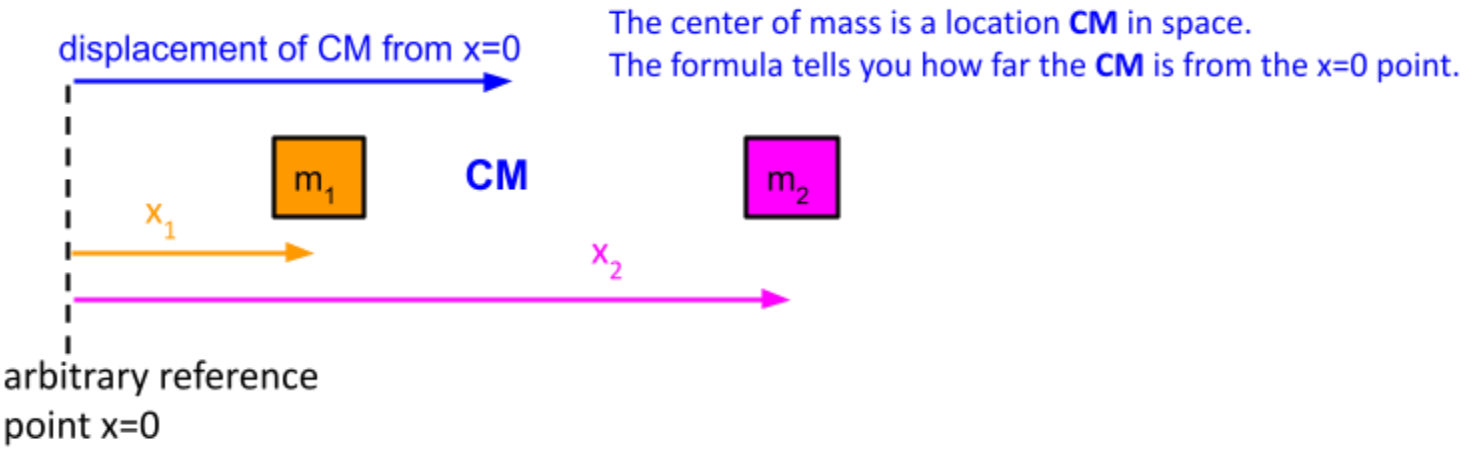
x_1 = the displacement of the mass 1 from an arbitrary x=0 reference point (that you choose)

m_2 = mass 2

x_2 = the displacement of the mass 2 from the same arbitrary reference point you chose for 1

$M_{total} = m_1 + m_2 + \ldots$

Note: This equation works for both the x and y direction. Just do one direction (..damn) at a time.



Note: To find the velocity of the center of mass use the formula $v_{CM} = \frac{m_1v_1 + m_2v_2 + \ldots}{m_1 + m_2 + \ldots}$