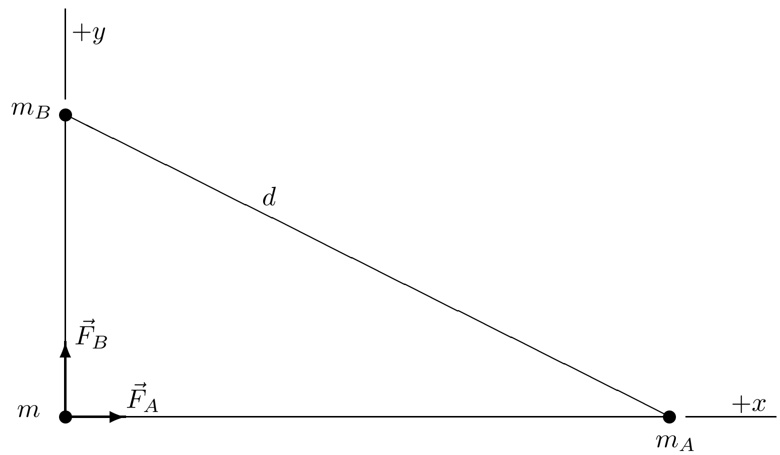
85. It is clear from the given data that the $m = 2.0$ kg sphere cannot be along the line between m_A and m_B (that is, it is "off-axis"). The magnitudes of the individual forces (acting on m, exerted by m_A and m_B respectively) are

$$F_A = \frac{Gm_A m}{r_A^2} = 2.7 \times 10^{-6} \text{ N} \quad \text{and} \quad F_B = \frac{Gm_B m}{r_B^2} = 3.6 \times 10^{-6} \text{ N}$$

where $r_A = 0.20$ m and $r_B = 0.15$ m. Letting d stand for the distance between m_A and m_B then we note that $d^2 = r_A^2 + r_B^2$ (that is, the line between m_A and m_B forms the hypotenuse of a right triangle with m at the right-angle corner, as illustrated in the figure below).



Choosing x and y axes as shown above, then (in Newtons) $\vec{F}_A = 2.7 \times 10^{-6}\,\hat{\imath}$ and $\vec{F}_B = 3.6 \times 10^{-6}\,\hat{\jmath}$, which makes the vector addition very straightforward: we find

$$F_{\text{net}} = \sqrt{F_A^2 + F_B^2} = 4.4 \times 10^{-6} \text{ N}$$

and (as measured counterclockwise from the x axis) $\theta = 53°$. It is not difficult to check that the direction of $\vec{F}_{\text{net}}$ (given by θ) is along a line that is perpendicular to the segment d.