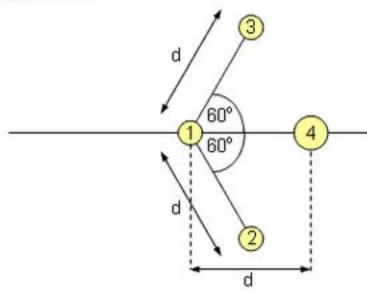# Problem 3



Four spheres, labeled 1, 2, 3, and 4, are arranged as shown in the figure. The spheres interact with each other through gravitational forces. They are far from the surface of the Earth and any other massive bodies.

Spheres 2, 3, and 4 have the same distance $d$ from sphere 1; the masses are $m_1 = m_2 = m_3 = m$ and $m_4 = 3m$.

(a) Draw the free-body diagram for sphere 1.

(b) Calculate the net force on sphere 1, $x$ and $y$ components. Note: $\cos(60^0) = 1/2$.
(c) Where do you have to place and additional sphere of mass $m$ in order for the net force on sphere 1 to be zero? Calculate the position and indicate it in a sketch.