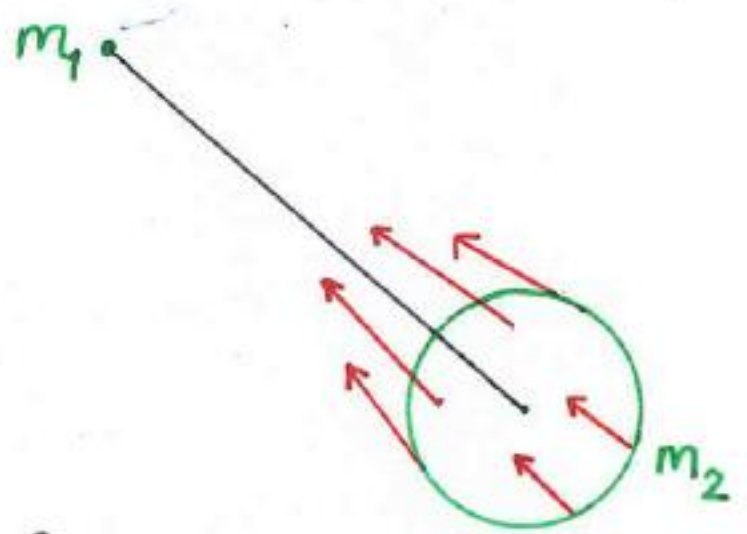
The gravitational force per unit mass is known as the gravitational field or gravitational acceleration, usually denoted $\vec{g}$

Planets are not point masses. To determine the NET force on m_1 due to m_2 (and vice versa) we must add together the forces from all parts of m_2



Suppose our extended body is spherical (as shown)

The total mass, $m_2 = \int \rho \, dV$

ρ = density = mass per unit volume

If the density is spherically symmetric (i.e. depends only on distance from centre of planet) the net gravitational force due to the extended body is IDENTICAL to the force from a point of the same total mass at its centre.