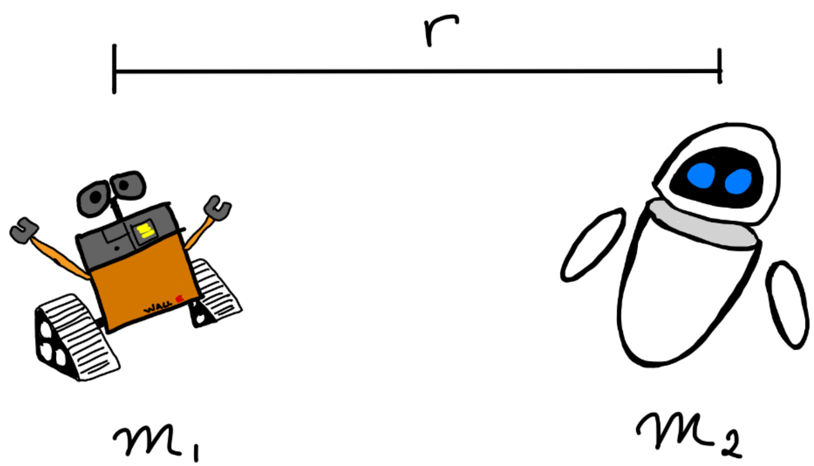
Universal Law of Gravitation

Any two objects with mass are going to feel a gravitational attraction to each other. The force that they will feel is given by Newton's Universal Law of Gravitation.



$$\boxed{F_G = G\,\frac{m_1 m_2}{r^2}}$$

$$G = 6.67 \times 10^{-11}\,\mathrm{N}\,\frac{\mathrm{m}^2}{\mathrm{kg}^2}$$

Homework

In this homework we will explore the distance dependence of the gravitational force.

Problem 1. a) Calculate the gravitational force felt by an astronaut with a mass of 100kg due to Earth's gravitational pull at the distances shown in the table below. For this, recall that the Earth's mass is $M=5.97 \times 10^{24}$kg.

b) Use the graph on the right to plot your results (don't forget to add the necessary labels on the graph).

c) Discuss what happens on the two limits (when the distance becomes small and large).

Distance [m]	Force [N]
6.4×10^6	9.6×10^2 N
8×10^6	
1×10^7	
2×10^7	
4×10^7