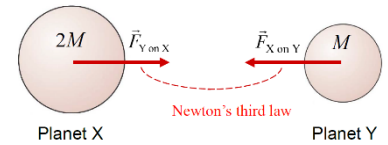


Universal Gravitation Introduction Questions:

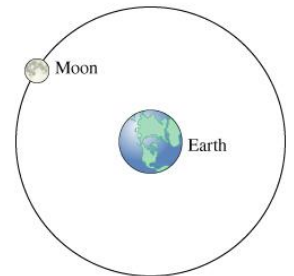
1. What is Newton's law of Universal Gravitation? (force formula)

$$F = \frac{GMm}{r^2}$$



2. Calculate the force of gravity between the moon and the earth.

$$1.99 \times 10^{20} \text{ NEWTONS}$$



3. What is the formula for finding *gravitational field strength* at a certain distance away from an object?

$$g = \frac{GM}{r^2}$$

4. What is *gravitational field strength*? (use your notes)

The amount of gravitational **force per kg** an object would experience when it is a particular distance away from another object.

What are **both** units for universal *gravitational field strength*?

N/kg or m/s²

5. What is the force on a 40kg sack of potatoes that sits in a gravitation field with a strength of 78N/kg?

$$g = \frac{F}{m}$$

$$98 \text{ N/kg} = \frac{F}{40 \text{ kg}}$$

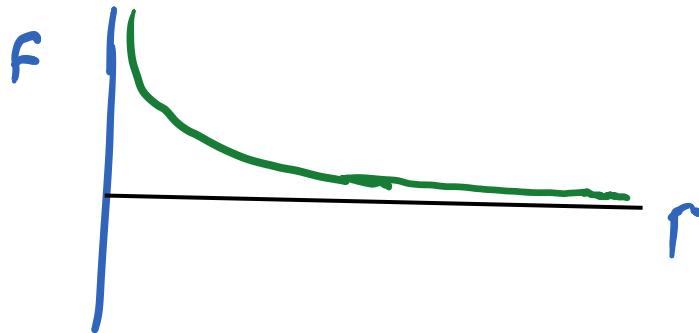
$$F = 3120 \text{ N}$$

6. What is the rate of acceleration of a 40kg sack of potatoes that is in a gravitational field with a strength of 3.2N/kg?

$$3.2 \text{ m/s}^2$$

7. Draw a graph that shows how the **Gravitational force** on an object changes as the **distance "r"** it is away from another object increases.
(force vs. "r" graph)

$$F = \frac{GMm}{r^2}$$



8.

Objects dropped near the surface of the moon fall with one sixth the acceleration of objects dropped near the surface of the earth. Which of the following is the correct value for the gravitational field strength at the moon's surface?

- A. 0.0027 N/kg
 B. 0.27 N/kg
 C. 1.6 N/kg
 D. 9.8 N/kg
- EARTH** 9.8 m/s^2 or N/kg
MOON $9.8/6$

9.

What is the gravitational field strength on the "surface" of Jupiter.

The mass of Jupiter is: $1.898 \times 10^{27} \text{ kg}$

The radius of Jupiter is: 69,911 km (watch your units)