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(10.01) - Universal Gravitation Worksheet

1. Use the information below to solve for the acceleration due to gravity on the moon's surface.
    a. Mass = 7.35×10^{22} kg, Radius = 1.74×10^{6} m

2. What would be the new acceleration due to gravity at an altitude of 500 km above the moon's surface?

3. Which of the following is the bigger force? You must explain your answer conceptually or mathematically.
    a. The gravitational force on the Moon by the Earth
    b. The gravitational force on the Earth by the Moon
    c. They are equal

Use the following situation for questions #4-6.

Object A and Object B are motionless and are situated a distance D apart. The gravitational force of attraction on A by B is calculated as F.

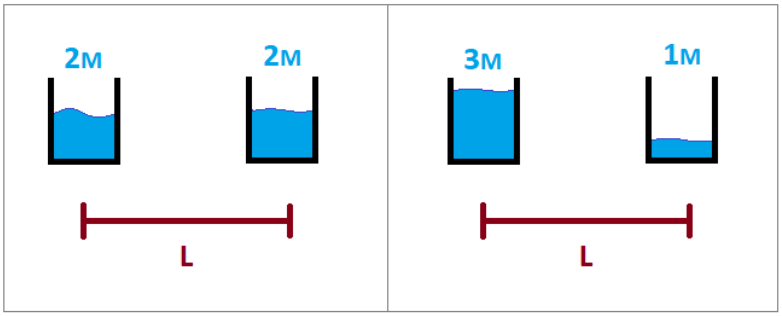
4. If only the mass of Object B is doubled, while all other variables are kept the same, what is the new value of the force on A by B?
    a. 4F
    b. 2F
    c. Still F
    d. ½ F
    e. ¼ F

5. If only the distance between the planets is doubled, while all other variables are kept the same, what is the new value of the force on A by B?
    a. 4F
    b. 2F
    c. Still F
    d. ½ F
    e. ¼ F

6. If both the mass of Object B and the distance between the objects are doubled, what is the new value of the force on A by B?
    a. 4F
    b. 2F
    c. Still F
    d. ½ F
    e. ¼ F

7. In scenario #1, two glasses of water are filled with equal mass 2M and separated by distance L. In scenario #2, a glass of water with mass 3M is separated by distance L from a second glass with mass M. If F_1 is the gravitational force between the glasses of water in scenario #1, what would be the gravitational force, in terms of F_1, between the glasses in scenario #2?

   a. $2F_1$
   b. $4/3\ F_1$
   c. Still F_1
   d. $3/4\ F_1$
   e. $1/2\ F_1$



Scenario #1 **Scenario #2**