Newton’s Law of Universal Gravitation

1) Two students are sitting 1.50 m apart. One student has a mass of 70.0 kg and the other has a mass of 52.0 kg. What is the gravitational force between them?

2) What gravitational force does the moon produce on the Earth is their centers are 3.88x108 m apart and the moon has a mass of 7.34x1022 kg?

3) If the gravitational force between objects of equal mass is 2.30x10-8 N when the objects are 10.0 m apart, what is the mass of each object?

4) Calculate the gravitational force on a 6.50x102 kg that is 4.15x106 m above the surface of the Earth?

5) The gravitational force between two objects that are 2.1x10-1 m apart is 3.2x10-6 N. If the mass of one object is 55 kg what is the mass of the other object?

6) If two objects, each with a mass of 2.0x102 kg, produce a gravitational force between them of 3.7x10-6 N. What is the distance between them?

1) 1.08x10-7 N 2) 1.94x1020 N 3) 186 kg 4) 2340 N 5) 38 kg 6) 0.85 m 7) 686 N 8) 343 N 9) 172 N 10) 0 N 11) 1.33x10-8 N

7) What is the gravitational force acting on a 70.0 kg object standing on the Earth’s surface?

8) What is the gravitational force on a 35.0 kg object standing on the Earth’s surface?   
(You can use your answer from #7 to reduce your calculations)

9) What is the gravitational force on a 70.0 kg that is 6.38x106 m **above** the Earth’s surface?  
(You can use your answer from #7 to reduce your calculations)

10) Three objects each with a mass of 10.0 kg are placed in a straight line 50.0 cm apart. What is the net gravitational force on the center object due to the other two?

50.0 cm

50.0 cm

11) Three objects A, B, C are placed 50.0 cm apart along a straight line. A and B have a mass of 10.0 kg, while C has a mass of 15.0 kg. What is the net force on B due to A and C?

50.0 cm

50.0 cm

A

B

C