Worksheet 5.1 - 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?
- 4) Calculate the gravitational force on a 6.50×10^2 kg that is 4.15×10^6 m above the surface of the Earth?

- 2) What gravitational force does the moon produce on the Earth is their centers are $3.88x10^8$ m apart and the moon has a mass of $7.34x10^{22}$ kg?
- 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?

- 3) If the gravitational force between objects of equal mass is 2.30×10^{-8} N when the objects are 10.0 m apart, what is the mass of each object?
- 6) If two objects, each with a mass of 2.0×10^2 kg, produce a gravitational force between them of 3.7×10^{-6} N. What is the distance between them?

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



- 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)
- 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?



9) What is the gravitational force on a 70.0 kg that is 6.38×10^6 m **above** the Earth's surface? (You can use your answer from #7 to reduce your calculations)