

## 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  $6.50 \times 10^4$  kg that is  $4.15 \times 10^6$  m above the surface of the Earth?

2) What gravitational force does the moon produce on the Earth if their centers are  $3.88 \times 10^8$  m apart and the moon has a mass of  $7.34 \times 10^{22}$  kg?

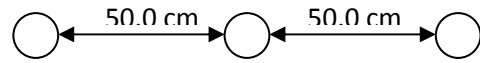
5) The gravitational force between two objects that are  $2.1 \times 10^{-1}$  m apart is  $3.2 \times 10^{-6}$  N. If the mass of one object is 55 kg what is the mass of the other object?

3) If the gravitational force between objects of equal mass is  $2.30 \times 10^{-8}$  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  $2.0 \times 10^2$  kg, produce a gravitational force between them of  $3.7 \times 10^{-6}$  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?

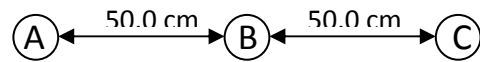
10) Three objects each with a mass of 10.0 kg are placed in a straight line 50.0 cm apart. What is the net gravitational force on the center object due to the other two?



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  $6.38 \times 10^6$  m **above** the Earth's surface?

(You can use your answer from #7 to reduce your calculations)