Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Physics 11

**Worksheet 5.1**

**Universal Gravitation**

|  |  |
| --- | --- |
| 1. Two students are sitting 1.5 m apart. One student has a mass of 70,000 g and the other has a mass of 52 kg. What is the gravitational force between them? | 4. Calculate the gravitational force on a 650 kg satellite that is 4150 km above the surface of the earth. |
| 2. What gravitational force does the moon produce on the Earth if their centres are 3.88x108 m apart and the moon has a mass of 7.34x1022 kg? | 5. The gravitational force between two objects that are 210 mm 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 2.3x10-8 N when the objects are 10 m apart, what is the mass of each object? | 6. If two objects, each with a mass of 200 kg, produce a gravitational force between them of 3.7x10-6 N, what is the distance between them? |

|  |  |
| --- | --- |
| 7. What is the gravitational force acting on a 70 kg object standing on earth’s surface? | 10. Three objects (A, B, and C) are placed 50 cm apart along a straight line. A and B have a mass of 10 kg each, while C has a mass of 15 kg. What is the net force on B due to A and C? Draw a FBD.  50 cm  50 cm  **A**  **B**  **C** |
| 8. What is the gravitational force on a 35 kg object standing on earth’s surface. | 11. Object B below experiences a net gravitational force of 2x10-8 N right due to A and C. If A and B are 15 kg, what is the mass of C? Start by drawing a FBD for object B.  30 cm  30 cm  **A**  **B**  **C** |
| 9. What is the gravitational force on you when you’re standing on the earth’s surface? |  |

Answers: 1) 1.08x10-7 N 2) 1.94x1020 N 3) 186 kg 4) 2338 N 5) 38.5 kg 6) 0.85 m 7) 685.9 N 8) 342.97 N 9) Answers will vary (duh!) 10) 1.33x10-8 N right 11) 16.8 kg