"G" Problems

1. Two bodies are 2 m apart. One body has a mass of 80 kg. The second body has a mass of 60 kg. What is the gravitational force between them?

2. (a) What is the gravitational force between two 800-kg cars that are 5 m apart? (b) What is the gravitational force between them when they are 50 m apart?

3. Two ships are docked next to each other. Their centers of gravity are 40 m apart. One ship weighs 9.8×10^7 N. The other ship weighs 1.96×10^8 N. what gravitational force exists between them?

4. Two space capsules, each of mass 1600 kg, are put into orbit 30-m apart, (a) what gravitational force exists between them? (b) What is he initial acceleration given to each capsule by this force?

5. The mass of the moon is about 7.3×10^{22} kg. The mass of the earth is 6.0×10^{24} kg. If the centers of the two are 3.6×10^8 m apart. What is the gravitational force between them?

6. Use Newton's second law of motion to find the acceleration given to the moon by the force calculated in problem 5.

7. The mass of an electron is 9×10^{-31} kg. The mass of a proton is $1.7 \times x10^{-27}$ kg. They are about 1.0×10^{-10} m apart in a hydrogen atom. What force of gravitation exists between the proton and the electron of the hydrogen atom?