Name: Universal Gravitation Assignment

1. On Earth, two parts of a space probe weigh 13000N and 7900N These parts are separated by a center to center distance of 32m and may be treated as uniform spherical objects. Find the magnitude of the gravitational force that each exerts on the other out in space far from any other objects. (5 marks)
2. Calculate the acceleration due to gravity on Jupiter. Jupiter has a radius of 71492km and its mass is 1.8986 x 1027kg (3 marks)
3. A space monkey weighs 380N on Earth. What will the monkey weigh on another planet whose radius is 3 times that of Earth and whose mass is half that of the Earth? (3 marks)
4. Iona Ford (m=65.0kg) feels like he weighs 441N, how far from the surface of the Earth is she? (4marks)
5. A distance of 2.50 mm separates two objects of equal mass. If the gravitational force between them is 0.0104 N, find the mass of each object. (3 marks)
6. If the gravitational field strength at the top of Mount Everest is 9.772 N/kg, approximately how tall is the mountain? (4 marks)
7. If you dropped a ball while standing on the surface of Mars, at what rate would it accelerate toward the ground? (2 marks)
8. A space probe lands on the surface of a spherical asteroid 402km in diameter and measures the strength of its gravitational field at that point to be 4.95 x 10-11 N/kg. What is the mass of the asteroid? (3 marks)

Information

**mass of: radius of:**

**Earth 🡪 5.98 x 1024 kg Earth 🡪 6.38 x 106 m**

**Jupiter 🡪 1.91 x 1027 kg Jupiter 🡪 7.14 x 107 m**

**Mars 🡪 6.43 x 1023 kg Mars 🡪 3.40 x 106 m**

**Mercury 🡪 3.32 x 1023 kg Mercury 🡪 2.44 x 106 m**

**moon 🡪 7.36 x 1022 kg Neptune 🡪 2.43 x 107 m**

**Neptune 🡪 1.03 x 1026 kg sun 🡪 7.00 x 108 m**

**Saturn 🡪 5.68 x 1026 kg Uranus 🡪 2.61 x 107 m**

**sun 🡪 1.99 x 1030 kg Venus 🡪 6.05 x 106 m**

**Uranus 🡪 8.74 x 1025 kg**

**Venus 🡪 4.89 x 1024 kg**