Universal Gravitation and Gravitational Fields

Name - _____

Use Table 8-1 on page 159 for some of the questions below.

1.) What is the force of gravity on the following masses at the earth's surface, use Universal Gravitation.

a.) 75 kg. b.) 500 g.

2.) The force of gravity on a mass is known to be $12\ 000\ N$ at earth's surface. What is the force of gravity at the following distances:

a.) 2.5 radii. b.) 3 radii. c.) 4 radii.

3.) Find the mass of a person who experiences a force of gravity of 281 N on the surface of Mars.

4.) What is the mass of the moon if a person on earth experiences a force of gravity of $735\ N$, the radius of the moon is 1.74×10^6 m and the force of gravity on the moon is $122\ N$.

5.) Show by calculation the gravitational field strength at:

a.) the earth's surface. b.) five radii. c.) the surface of the sun.

6.) A spaceship experiences a gravitational field toward the earth of $2.0\,\frac{N}{kg}$, what would the same field strength be when the ship is half that distance from the earth?

7.) 1 pound is about $4.5\ N$, how much would a $10\ kg$ cat weigh on Mars, Earth, and Jupiter?

Answers - 1.) 735 N, 4.9 N 2.) 1920 N, 1333 N, 750 N 3.) 75 kg 4.) $7.4 \times 10^{22} kg$ 5.) $9.8\frac{N}{kg}$, $0.392\frac{N}{kg}$, $274\frac{N}{kg}$
6.) $8\frac{N}{kg}$ 7.) 8.3 lbs, 22 lbs, 609 lbs