Gravity & Circular Motion Test Review (Ch. 7)

Formulas you'll be given:

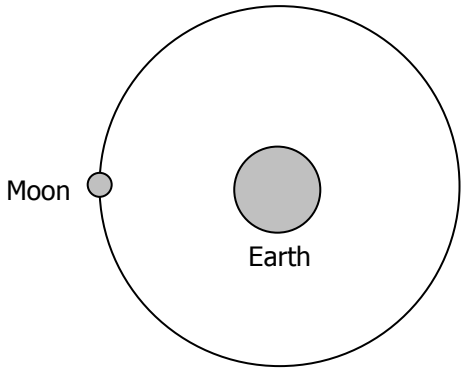
Gravitational Force: $\mathbf{F_g = \frac{G \cdot m_1 \cdot m_2}{d^2}}$, where G is $6.67\times10^{-11}\ N \cdot m^2/kg^2$

Directions: Answer all of the following on a separate sheet of paper.

1. Explain the difference between $\mathbf{F_g}$ and **g**. Which one depends on the mass of the falling object?
2. Define centripetal force and give two examples to illustrate it.

Practice Problems:

3. In the following picture of the moon going around the earth, draw and label vectors to show the gravitational force acting on the moon and the velocity of the moon.
    a. Does the gravitational force increase the speed of the moon?
    b. Does the gravitational force change the direction of the moon?
    c. What do you call a force that causes changes in an object's direction (as in going in a circle) but not changes in its speed?



From the Book: **p. 263 #2, 13-14, 22, 23**
Multiple Choice: p. 268 #1, 3-5, 14

Answers to Multiple Choice
1.C 3.C 4.G 5.D

4. What happens to the gravitational force between two objects if:
    a. Mass 1 doubles?
    b. Mass 1 doubles and mass 2 triples?
    c. Distance triples?
    d. Mass 1 becomes half, mass 2 triples, and distance becomes half
5. Does gravitational force depend more on distance or on mass? Why?
6. What factors determine *g*, the acceleration due to gravity on a planet?
7. Calculate the gravitational force between the Sun and Mars, using the following information

    mass of the sun = $2.00\text{x}10^{30}$ kg
    mass of Mars = $6.425\text{x}10^{23}$ kg
    distance between sun and Mars = $2.28\text{x}10^{11}$ m *answer = $1.65\text{x}10^{21}$ N*

8. When a car is turning at constant speed, which direction is the net force? (inward or outward?)
    What do you call a net force that causes objects to travel around in a circle? _____
    When a car is turning, what force is causing the car to travel in a circle (hint: what happens when you try to turn the wheels on an icy road?)