Reminders 04-27-10:

-POW 11 Due April 29

-Quiz in Recitation This Week (Ch 11 and 12)

-Quiz in Recitation Next Week on Today's Lecture

-Exam 4 Thursday April 29 Chapters 10-12

Objectives

-Gravitational Force

-Inertial Mass vs. Gravitational Mass

-Gravitational Field

-Gravitational Potential Energy

$$|F_1| = \frac{G8M^2}{(2r)^2} = \frac{2GM^2}{r^2}$$

$$\vec{F_1} = \frac{2GM^2}{r^2}\hat{i}$$

$$|F_2| = \frac{G2M^2}{r^2} \qquad \vec{F_2} = \frac{2GM^2}{r^2}\hat{j}$$

$$\vec{F} = \frac{2GM^2}{r^2}(\hat{i}+\hat{j})$$

$$|\vec{F}| = 2\sqrt{2}\,\frac{GM^2}{r^2}(\hat{i}+\hat{j})$$

$$\theta = \tan^{-1}\left(\frac{F_y}{F_x}\right) = 45^\circ \text{ above } +x\text{-axis}$$

$$F_G = \frac{G M_E m_A}{(R_E + h)^2}$$

$$= \frac{(6.67 \times 10^{-11}\ N\text{-}m^2/kg^2)(5.98 \times 10^{24}\ kg)(100\ kg)}{(6.37 \times 10^6\ m + 1.60 \times 10^5\ m)^2}$$

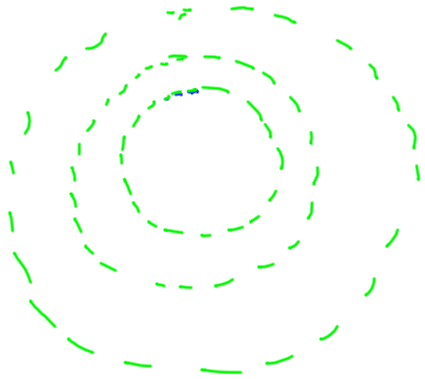
$$= 733\ N$$

$$g = 7.33\ m/s^2$$

Equiv Principle

1. All laws of nature have same form in all reference frame.

2. Gravitational field ≡ accelerated frame in a gravity free environment



1. Strength of the field is prop to the number of lines/area.

2). The number of field lines proportional to the mass.

3. Field lines start at infinity and end on mass (source of field)

4. Field lines do not cross.

5.) Direction of field is tangent to field lines.

6.) The number of lines passing $\perp$ to any surface surrounding a mass is proportional to the mass enclosed within the surface.

7. The number of lines passing $\perp$ to any surface is called the flux.

$$\vec{g} = -\frac{G m_1}{r^2}\hat{r} \qquad \vec{g} = \frac{\vec{f}}{m}$$

This expression allows one to determine the strength of the gravitational field at any location space. The term r^2 is the distance from the source of the field to the point where the field is to be determined, squared.
The unit vector in the above equation is directed from the source of the field to the point at which the field is to be determined.