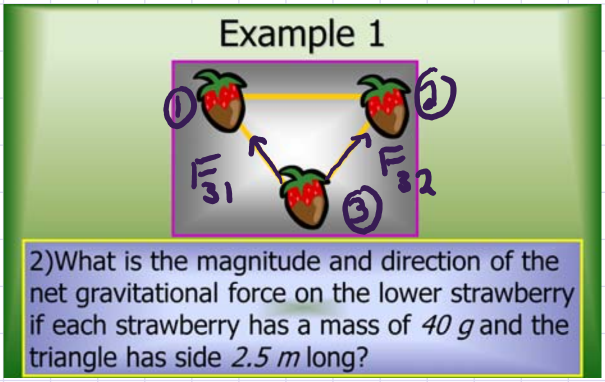
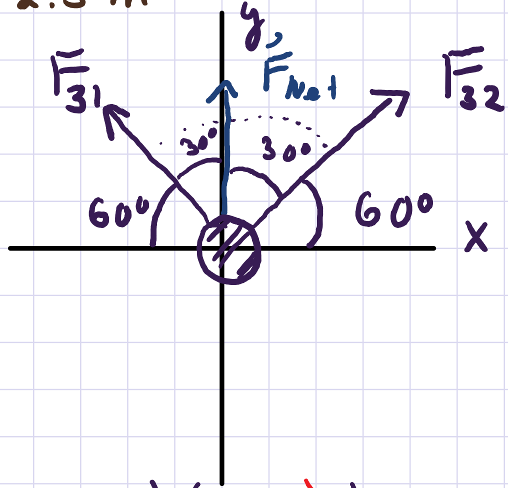
Example 1

Monday, January 12, 2015 7:45 AM



$m = 40\,g = .04\,kg$

$r = 2.5\,m$



$$F_{32} = F_{31} = F = G\frac{m_1 m_3}{r^2}$$

$$F = \left(6.67 \times 10^{-11} N \frac{m^2}{kg^2}\right)\frac{(.04\,kg)(.04\,kg)}{(2.5\,m)^2} = 1.71 \times 10^{-14} N$$

$$\vec{F}_{Net} = \Sigma \vec{F}$$

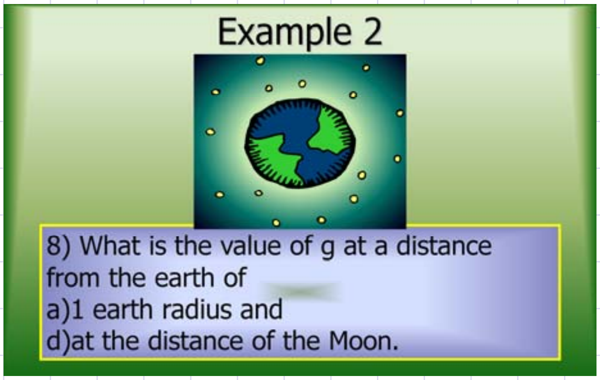
$$F_{Net_x} = \Sigma F_x = F_{32}\cos(60°) - F_{31}\cos(60°) = 0$$

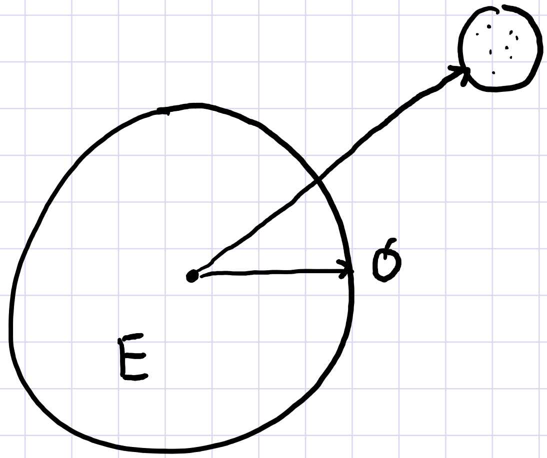
$$F_{Net_y} = \Sigma F_y = F_{32}\sin(60°) + F_{31}\sin(60°) = 2F\sin(60°)$$

$$F_{Net_y} = 2(1.71 \times 10^{-14} N)\sin(60°) = 2.9 \times 10^{-14} N$$

Example 2

Tuesday, January 13, 2015 3:14 PM





$$W = mg$$

$$W = G\frac{mM_E}{r_E^2}$$

$$\cancel{m}g = G\frac{\cancel{m}M_E}{r_E^2}$$

$$g = G\frac{M_E}{r_E^2}$$

$$g = (6.67\times10^{-11}\,N\frac{m^2}{kg^2})\frac{(5.98\times10^{24}\,kg)}{(6.38\times10^{6}\,m)^2}$$

$$g = 9.79\,m/s^2 \approx 9.8\,m/s^2$$

$M_E = 5.98\times10^{24}\,kg$

$r_E = 6.38\times10^{6}\,m$

$r_m = 384\times10^{6}\,m$

at Moon: $g = G\frac{M_E}{(r_E + r_m)^2}$

$$g = (6.67\times10^{-11}\,N\frac{m^2}{kg^2})\frac{(5.98\times10^{24}\,kg)}{(6.38\times10^{6}\,m + 384\times10^{6}\,m)^2}$$

$$g = .0026\,m/s^2$$