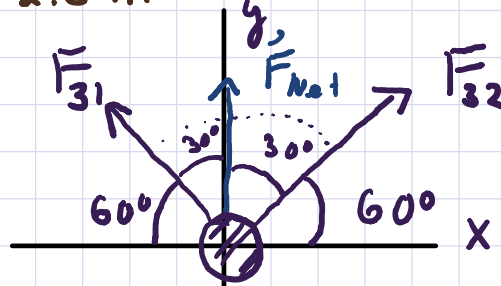
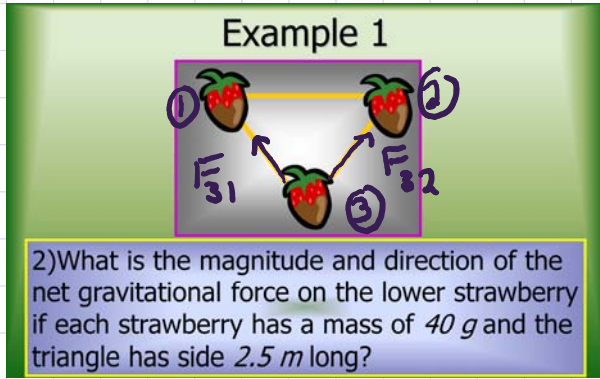


Example 1

Monday, January 12, 2015 7:45 AM

$M = 40 \text{ g} = .04 \text{ kg}$
 $r = 2.5 \text{ m}$



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

$$F = (6.67 \times 10^{-11} \text{ N} \frac{\text{m}^2}{\text{kg}^2}) \frac{(0.04 \text{ kg})(0.04 \text{ kg})}{(2.5 \text{ m})^2} = 1.71 \times 10^{-14} \text{ N}$$

$$\vec{F}_{\text{net}} = \sum \vec{F}$$

$$F_{\text{net}_x} = \sum F_x = F_{32} \cos(60^\circ) - F_{31} \cos(60^\circ) = 0$$


$$F_{\text{net}_y} = \sum F_y = F_{32} \sin(60^\circ) + F_{31} \sin(60^\circ) = 2F \sin(60^\circ)$$

$$F_{\text{net}_y} = 2(1.71 \times 10^{-14} \text{ N}) \sin(60^\circ) = 2.9 \times 10^{-14} \text{ N}$$

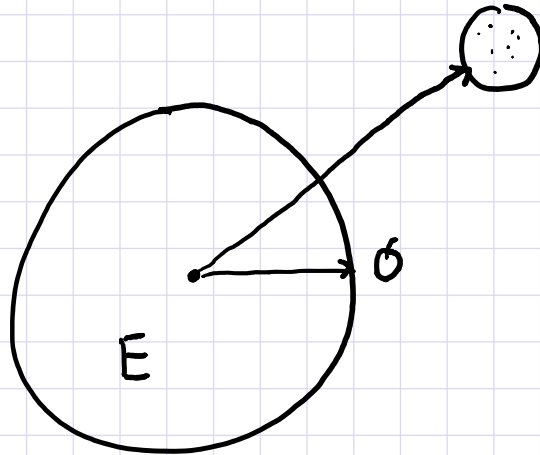
Example 2

Tuesday, January 13, 2015 3:14 PM

Example 2



8) What is the value of g at a distance from the earth of
 a) 1 earth radius and
 d) at the distance of the Moon.



$$W = mg$$

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

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

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

$$g = (6.67 \times 10^{-11} \text{ N} \frac{\text{m}^2}{\text{kg}^2}) \frac{(5.98 \times 10^{24} \text{ kg})}{(6.38 \times 10^6 \text{ m})^2}$$

$$g = 9.79 \text{ m/s}^2 \approx 9.8 \text{ m/s}^2$$

$$M_E = 5.98 \times 10^{24} \text{ kg}$$

$$r_E = 6.38 \times 10^6 \text{ m}$$

$$r_m = 384 \times 10^6 \text{ m}$$

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

$$g = (6.67 \times 10^{-11} \text{ N} \frac{\text{m}^2}{\text{kg}^2}) \frac{(5.98 \times 10^{24} \text{ kg})}{(6.38 \times 10^6 \text{ m} + 384 \times 10^6 \text{ m})^2}$$

$$g = .0026 \text{ m/s}^2$$