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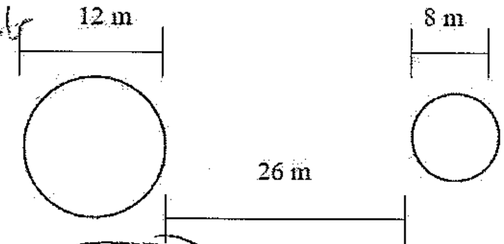
1. Does gravity increase or decrease with greater distance? decrease

2. Does gravity increase or decrease with greater mass? increase

3. If one of the masses is tripled, how does the gravity change? 3 times as strong

4. If the distance between the masses is doubled, how does the gravity change? 1/4 as strong (Inverse Square Law)

5. What does the "r" in the equation mean?
distance between the centers of the two objects



6. To find the gravitational force between the two objects at the right, r = ? $6+26+4 = 36m$

7. A 6.5×10^{12} kg object is 3.2×10^{4}m away from a 3,800 kg object. Calculate the force of gravity between them.

$$F_g = G\frac{m_1 m_2}{r^2} = 6.673\times10^{-11}\frac{(6.5\times10^{12}kg)\cdot 3800kg}{3.2\times10^{4}} = 0.0016N$$

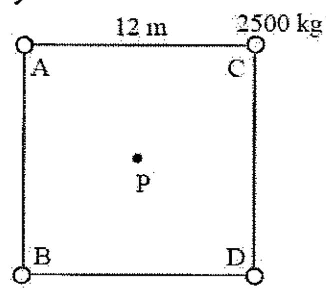
8. A 35 kg object is on the surface of Venus. Venus has a mass of 4.87×10^{24}kg and a radius of 6.05×10^{6} m.
   A. What is the weight of the object on the earth (*use g = 9.8 m/s²*)? $F_W = 35kg \cdot 9.8m/s^2 = 343N$

   B. What is the mass of the object on the earth? 35kg

   C. What is mass of the object on Venus? 35kg

   D. What is weight of the object on Venus? $= 6.673\times10^{-11}\frac{4.87\times10^{24}kg \cdot 35kg}{(6.05\times10^{6}m)^2} = 311N$ (Very close to Earth)

9. Four identical 2500 kg objects are at the corners of a square with 12 m sides.



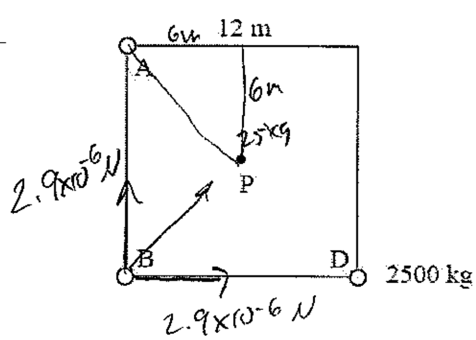
   A. What is the distance between A and B? 12m

   B. Calculate the force of gravity between A and B.
   $G\frac{2500kg \cdot 2500kg}{12m^2}$

   C. Calculate the force of gravity between B and D.
   $2.9\times10^{-6}N$

   E. A 25 kg object is then placed at the center of the square (point P). Remembering that force is a vector, calculate the net force on the object at point P.
   0N; by symmetry all of the x & y component cancel at the center

10. Object C is then removed, as is the object at point P.
   A. Draw (with arrows) and label the gravitational forces on Object B, due to objects A and D.



   B. Calculate the net gravitational force on Object B.
   $F_{net} = (2.9\times10^{-6})^2 + (2.9\times10^{-6})^2 = c^2$ $4.1\times10^{-6}N$
   $\theta = 45°$

   The 25 kg object is placed back at point P.

   C. Calculate the distance between each corner and point P.
   $r^2 = \sqrt{6^2+6^2} = 8.49m$

   D. Calculate the new gravitational force on the object at point P.

$$F_g = G\frac{25kg(2500kg)}{(8.49m)^2} = 5.79\times10^{-8}N$$