Answer on Question 48973, Physics, Astronomy — Astrophysics
A large number of identical point masses m are placed alone x-axis at x= 0,1,2,4,..... The magnitude of gravitational force on mass at origin(x=0) will be 1. Gm^2 2. (4/3) Gm^2 3. (2/3) Gm^2 4. (5/4) Gm^2
Solution
Gravitational force from single mass is

$$F = \frac{Gm^2}{r^2}$$

where r is distance to origin. Hence, we have to sum all the masses, and the force will be

$$F_{total} = Gm^2 \sum_{1}^{\infty} \frac{1}{(2^n)^2} = Gm^2 \sum_{0}^{\infty} \frac{1}{2^{n+1}} = Gm^2 \sum_{1}^{\infty} \frac{1}{2^n} = Gm^2$$

Answer is 1. Gm^2