Answer on Question #43886, Physics, Mechanics | Kinematics | Dynamics

radius of orbit of satellite of earth is R. Its kinetic energy is proportional to what?

Solution:

Gravitational force plays the role of centrifugal force. That is due to gravity satellite does not fly away from the Earth as it moves around. (Movement in a circle accompanied by an acceleration. Since the vector (direction) of velocity for this motion changes, each accelerated motion caused by force. Not vice versa.)

In this case from circle motion kinematics known

$$F = m\frac{v^2}{R} = \frac{2K}{R}$$

K - kinetic energy (v<<c)

For satellite : $F = G\frac{mM}{R^2}$

$$K = \frac{R}{2} * G\frac{mM}{R^2} = G\frac{mM}{2R}$$

Where M – mass of Earth and G – fundamental gravitational constant