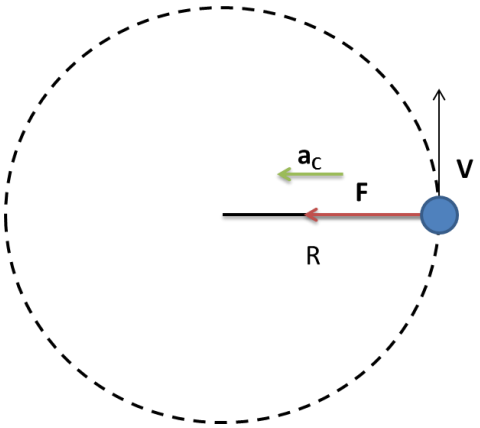
Answer on Question #43482, Physics, Mechanics | Kinematics | Dynamics

if the gravitational force between two objects is proportional to 1/R (and not to 1/R^2) where R is the separation between them, then particle in circular orbit under such force would have its orbital speed v proportional to?

OPTIONS
a)1/R^2
b)R
C)R^1
d)1/R

**Solution**.




From Newton's 2nd law for the particle:

$$F_{grav} = ma_C$$

Where $a_C$ is centripetal acceleration of particle.

From condition:

$$F_{grav} = \frac{\alpha}{R}$$

So:

$$\frac{\alpha}{R} = ma_C = m\frac{V^2}{R} \Rightarrow V = \sqrt{\frac{\alpha}{m}} = \sqrt{\frac{\alpha}{m}} \cdot R^0$$

**Answer:** $V \sim R^0$

no right answer among proposed options.

Options b) and c) looks the same. Check the condition.