

Answer on Question #43213, Physics, Mechanics | Kinematics | Dynamics

If radius of a circle in which an object is moving at constant speed is doubled and the mass of the object is also doubled. The resulted centripetal force will be?

- A. one quarter as great as before
- B. one half as great as before
- C. remain constant
- D. twice as great as before
- E. four times as great as before

Solution:

Any motion in a curved path represents accelerated motion, and requires a force directed toward the center of curvature of the path. This force is called the centripetal force which means "center seeking" force. The force has the magnitude

$$F_{centripetal} = m \frac{v^2}{r}$$

Thus, if $m_2 = 2m_1$ and $r_2 = 2r_1$

$$\frac{F_2}{F_1} = \frac{m_2 r_1}{m_1 r_2} = \frac{2m_1 r_1}{m_1 2r_1} = 1$$

Answer: C. remain constant