

## Answer on Question #45266, Physics, Mechanics | Kinematics | Dynamics

### Question:

A particle of mass  $m$  moves with constant speed  $v$  on a circular path of radius  $r$ . Find magnitude of average force on it in half revolution.

### Answer:

From Newton's second law, force is related to momentum  $p$  by:

$$F = \frac{\Delta p}{\Delta t}$$

where  $\Delta t$  is time,  $\Delta p$  is change of momentum,  $F$  is average force.

Change of momentum in half revolution equals:

$$\Delta p = 2mv$$

And time of the half revolution equals:

$$\Delta t = \frac{\pi r}{v}$$

Therefore:

$$F = \frac{2mv}{\frac{\pi r}{v}} = \frac{2}{\pi} \frac{mv^2}{r}$$

Answer:  $\frac{2}{\pi} \frac{mv^2}{r}$