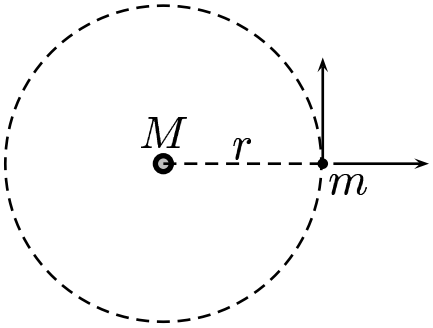
Note: The energy is independent of direction of the knock. For instance, it could be along the tangential or the radial direction.



Determine the energy ΔK_{min} required to knock a planet out of the solar system.

A) $\Delta K_{min} = \dfrac{G\,m\,M}{r}$.

B) $\Delta K_{min} = \dfrac{G\,m\,M}{2\,r}$.

C) $\Delta K_{min} = \dfrac{G\,m\,M}{r^2}$.

Minimum kinetic energy or the increment of the kinetic energy required ΔK is given by

$$U(\,r\,) + K + \Delta K = 0\,.$$

So,

$$\Delta K = \frac{G\,m\,M}{r} - \frac{G\,m\,M}{2\,r} = \frac{G\,m\,M}{2\,r}\,.$$

Answer **B**

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