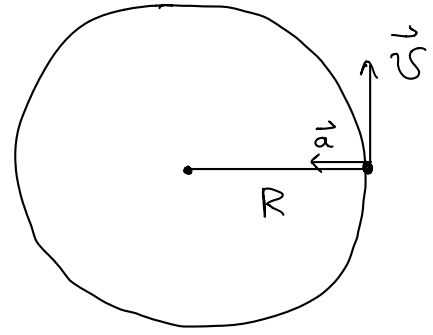# Module 5 - Uniform Circular Motion

Keywords: circle, orbit, curved

Type of problems:

- Orbits
- Rotating objects
- Car on a curved road (hill /valley)
- Pendulum

Relevant formulas:

$$v = \frac{d}{t} = \frac{2\pi r}{T}$$ period (time per revolution)

$$a = \frac{v^2}{r} \rightarrow \text{centripetal acceleration, towards the center}$$

Key points:

- Centripetal acceleration is required for circular motion
- Centripetal acceleration is pointing towards the center
- Sum of all forces is pointing towards the center ($\Sigma \vec{F} = m\vec{a}$)
- Velocity is perpendicular to radius (acceleration)
- Velocity is tangential to the circular path

General approach:

$$\Sigma \vec{F} = m\vec{a}$$

FBD → Sum of all forces $\longleftrightarrow$ acceleration

(same direction!)

Period $T = \frac{v}{d}$, where d is distance traveled (circular path!)

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