Circular Motion Equations Worksheet

Level: A-Level / AP Physics 1 / IB HL | Difficulty: Advanced | Topic: Mechanics

Practice uniform circular motion with 10 problems covering centripetal acceleration, centripetal force, angular velocity, and period. Full solutions included.

Equations you will need

a = v^2/r	Centripetal acceleration
F = mv^2/r	Centripetal force
? = v/r	Angular velocity
T = 2pi/?	Period
v = 2pir/T	Linear speed from radius and period

Symbol key

Symbol	Quantity	Unit
a	centripetal acceleration	m/s^2
v	linear speed	m/s
r	radius	m
F	centripetal force	N
?	angular velocity	rad/s
T	period	s
m	mass	kg

Practice problems

1. A car travels at 10 m/s on a circular track of radius 20 m. Find centripetal acceleration.

2. Find the centripetal force on a 1500 kg car going 25 m/s around a 50 m radius curve.

3. A point on a 0.3 m diameter wheel rotates at 4 rev/s. Find linear speed.

4. Find the period of a satellite in a 7000 km orbit moving at 7500 m/s.

5. A 0.5 kg ball on a 1 m string is whirled at 3 rev/s. Find the tension.

6. A 800 kg car rounds a flat curve of radius 40 m at 15 m/s. Find required friction force.

7. Find ? for an object completing one revolution every 4 seconds.

8. A 2 kg mass swings in a horizontal circle of radius 0.8 m at angular velocity 5 rad/s. Find centripetal force.

9. A car at 20 m/s rounds a curve where max friction force = 8000 N. Min radius if car mass is 1200 kg?

10. The Moon orbits Earth in 27.3 days at radius 3.84x108 m. Find its orbital speed.