

CAIE Physics A-level

12 - Motion in a Circle

Flashcards

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What are radians a unit of?



What are radians a unit of?

An angle



How do you convert degrees to radians?



How do you convert degrees to radians?

To convert an angle from degrees to radians, divide it by 360 and then multiply by 2π .



What is meant by the period of a body in circular motion?



What is meant by the period of a body in circular motion?

The time taken for one full rotation.



What is meant by angular velocity?



What is meant by angular velocity?

The angle travelled through (in radians) divided by the time taken to travel through it.

This is similar to linear speed, except we're interested in the rate of rotation rather than distance/time.



What kind of force is required to keep an object moving in a circle at constant speed?



What kind of force is required to keep an object moving in a circle at constant speed?

A constant centripetal force. This force always acts towards the centre of the circular path.



True or false? The centripetal acceleration and the velocity of a body moving in a circle are always in the same direction.



True or false? The centripetal acceleration and the velocity of a body moving in a circle are always in the same direction.

False. The velocity always follows the tangent to the circle. The centripetal force and hence the acceleration act along its radius (towards the centre). They are perpendicular.



How are linear and angular velocity related?



How are linear and angular velocity related?

$$v = r\omega$$

Where v is the linear velocity, ω is the angular velocity, and r is the radius of the circle.



How are the angular velocity and the oscillation period related?



How are the angular velocity and the oscillation period related?

$$\omega = 2\pi/T$$

Where ω is the angular velocity, and r is the radius of the circle.



A body moving in a circle at a constant speed is not accelerating. True or False?



A body moving in a circle at a constant speed is not accelerating. True or False?

False. The direction is always changing hence the absolute velocity is always changing (even if the angular velocity remains consistent).

This means the body is accelerating.



What equation gives acceleration in terms of angular velocity?



What equation gives acceleration in terms of angular velocity?

$$a = r\omega^2$$



What is acceleration in terms of linear velocity?



What is acceleration in terms of linear velocity?

$$a = v^2 / r$$



What are the equations for centripetal force?



What are the equations for centripetal force?

$$F = mv^2/r$$

Or

$$F = mr\omega^2$$

