Centripidal Force and acceleration

A particle is said to be in uniform circular motion if it travels in a circle (or arc) with constant speed v. Centripidal means centre-seeking.



Figure 6.1 An object moving in a circle of radius r.

The magnitude of the velocity of the particle in Figure 6.1 is not changing, but its direction IS. Therefore, there is an acceleration, even though the speed is not changing!

The direction of the acceleration is given by: $\Delta v = v_2 - v_1 = v_2 + (-v_1)$ The **direction** of the acceleration is toward the center of the circle.



The equation for the **centripidal acceleration** is: v^2

 $\begin{array}{l} a_c = \frac{v}{r} \\ \text{The equation for the centripidal force is:} \\ F_c = ma_c \\ F = \frac{mv^2}{r} \\ \text{The centripidal force is the$ *net force* $of an object in circular motion.} \\ F_c = F_{net} \end{array}$

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