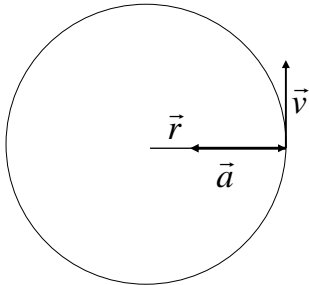


The centripetal force



We have an acceleration perpendicular to the speed

At constant circular motion the acceleration is given by:

$$a = r \cdot \omega^2 = \frac{v^2}{r}$$



$$F = m \cdot a$$

$$F = m \cdot r \cdot \omega^2 = \frac{m \cdot v^2}{r}$$

The centripetal force

Example: Calculate the tension in the rope, when I make 2,0 revolutions per second. The length of the rope is 30 cm. The cork has a mass of 50 gram.

$$G : f = 2,0\text{Hz}; r = 30\text{cm} = 0,30\text{m}; m = 50\text{g} = 50 \cdot 10^{-3}\text{kg}; F : F_{cp}$$

$$S : F = m \cdot r \cdot \omega^2 \quad \omega = 2\pi \cdot f$$

$$F = m \cdot r \cdot (2\pi \cdot f)^2$$

$$F = 50 \cdot 10^{-3}\text{kg} \cdot 0,30\text{m} \cdot (2\pi \cdot 2,0\text{Hz})^2 = 2,4\text{N}$$