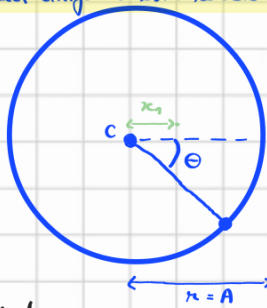
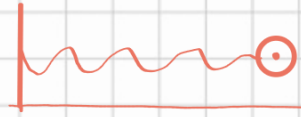


Movimento circular uniforme está relacionado com o movimento harmónico simples



→ velocidade angular
 $\omega = \frac{2\pi}{T}$



Vista de lado:



a)

$$\begin{aligned} F_x &= m a_x(t) \\ &= m [x(t)]'' \\ (*) \\ \hookrightarrow &= -m \omega^2 x(t) \\ &= -m \left[\frac{k}{m} \right] x(t) \\ &= -k x(t) \end{aligned}$$

$$\begin{aligned} [x(t)]'_t &= A \cos(\omega t + \phi) \\ &= -\omega A \sin(\omega t + \phi) \\ &\quad \quad \quad \underbrace{\hspace{1.5cm}}_{v(t)} \end{aligned}$$

$$\begin{aligned} [x(t)]''_t &= -\omega^2 A \cos(\omega t + \phi) \\ &\quad \quad \quad \underbrace{\hspace{1.5cm}}_{x(t)} \end{aligned}$$

b)

No instante inicial ($t=0$) consideramos a amplitude máxima q e $\theta = \omega t + \phi = 0$:
 pois $v=0$

$$\begin{aligned} 0 &= \omega t + \phi \\ \boxed{t=0} \\ \hookrightarrow 0 &= \phi \end{aligned}$$

Logo: $x(t) = A \cos(\omega t)$

$$\boxed{v(t) = -A \omega \sin(\omega t)} \text{ exato, } \omega = \sqrt{\frac{k}{m}} = 1$$

$$F_x = -k x(t)$$

$$a_x = -x(t)$$