1. Basic Variables & kinematics equations

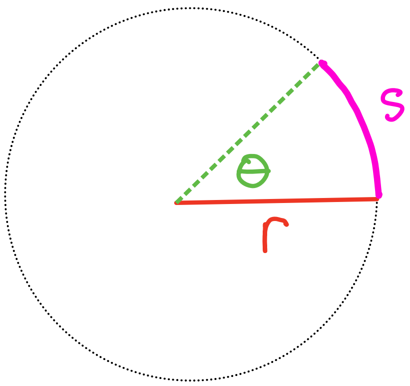
DEFINITIONS

LINEAR			ROTATIONAL / ANGULAR	
x	(m)	→	θ	(radians)
$v = \frac{dx}{dt}$	(m/s)	→	$\omega = \frac{d\theta}{dt}$	(rad/s)
$a = \frac{dv}{dt}$	(m/s²)	→	$\alpha = \frac{d\omega}{dt}$	(rad/s²)
$\bar{v} = \frac{\Delta x}{t}$		→	$\bar{\omega} = \frac{\Delta \theta}{t}$	

DERIVED EQUATIONS (constant acceleration)

LINEAR		ROTATIONAL / ANGULAR
$\bar{v} = \frac{v_i + v_f}{2}$	→	$\bar{\omega} = \frac{\omega_i + \omega_f}{2}$
$x = \frac{1}{2}at^2 + v_i t + x_i$	→	$\theta = \frac{1}{2}\alpha t^2 + \omega_i t + \theta_i$
$v = at + v_i$	→	$\omega = \alpha t + \omega_i$
$v_f^2 = v_i^2 + 2a\Delta x$	→	$\omega_f^2 = \omega_i^2 + 2\alpha\Delta\theta$

2. Motion along a curved (circular) path



$$s = r\theta$$

* radians are a dimensionless unit!
* don't write it when mixed w/ linear stuff

$$v = r\omega$$

* Since $v = \frac{ds}{dt} = \frac{d(r\theta)}{dt} = r\frac{d\theta}{dt} = r\omega$
* $v \rightarrow$ "linear speed"
* $\omega \rightarrow$ "angular/rotational speed"

$$a_t = r\alpha$$

* a_t = "tangential" acceleration
* $a_t = \frac{dv}{dt}$ ⋯> the rate @ which object speeds up

$$a_r = r\omega^2$$

* a_r = "radial" acceleration a.k.a. centripetal acceleration
* $a_c = \frac{v^2}{r} = \frac{(r\omega)^2}{r} = r\omega^2$

NOTE: $\vec{a}_t$ & $\vec{a}_r$ are defined based on VELOCITY

a_t is $\parallel$ to $\vec{v}$ → changes magnitude of $\vec{v}$

a_r is $\perp$ to $\vec{v}$ → changes direction of $\vec{v}$