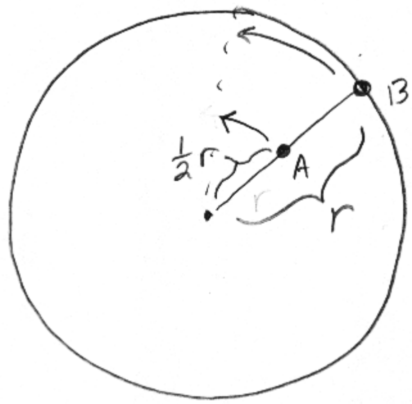
Angular velocity and frequency / Period

$$\omega = \frac{2\pi}{T}$$

$$\omega = f \cdot 2\pi$$

$T = 1s$

$r = 1m$



linear velocity (tangential)

A $V = \frac{2\pi r}{2T} = \pi \, m/s$ or $3.14 \, m/s$

B $V = \frac{2\pi r}{T} = 2\pi \, m/s$ or $6.28 \, m/s$

Angular velocity

A $\omega = \frac{2\pi}{T} = 2\pi \, rad/s$

B $\omega = \frac{2\pi}{T} = 2\pi \, rad/s$

Analogy to linear Kinematics

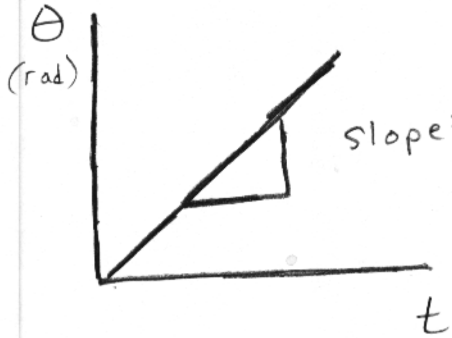
linear	Angular
ΔX	$\Delta\theta$
$\bar{V}$	$\bar{\omega}$
$\bar{a}$	$\bar{\alpha}$

Linear	Angular
$\bar{V} = \frac{\Delta X}{\Delta t}$	$\bar{\omega} = \frac{\Delta\theta}{\Delta t}$
$\bar{a} = \frac{V - V_0}{\Delta t}$	$\bar{\alpha} = \frac{\omega - \omega_0}{\Delta t}$

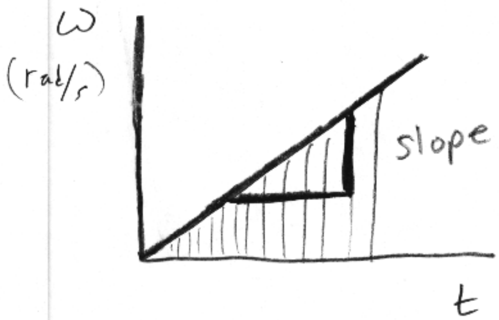
★ For constant $\bar{\alpha}$

linear	Angular
$V = V_0 + at$	$\omega = \omega_0 + \alpha t$
$x = x_0 + V_0 t + \frac{1}{2}at^2$	$\theta = \theta_0 + \omega_0 t + \frac{1}{2}\alpha t^2$
$V^2 = V_0^2 + 2a\Delta X$	$\omega^2 = \omega_0^2 + 2\alpha\Delta\theta$

Angular Motion Graphs



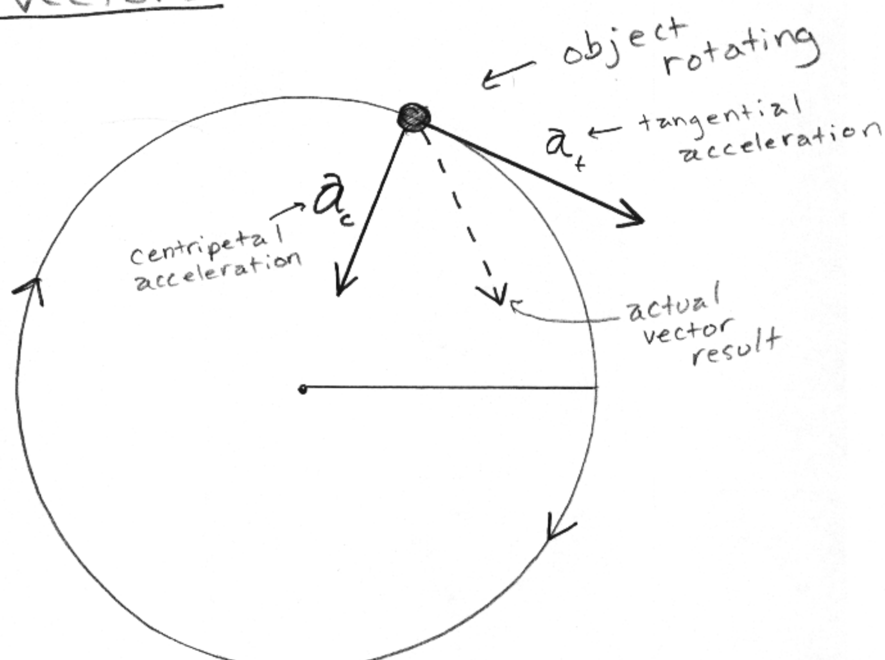
$$\text{slope} = \frac{\Delta\theta}{\Delta t} = \bar{\omega}$$



$$\text{slope} = \frac{\Delta\omega}{\Delta t} = \bar{\alpha}$$

$\text{Area} = \omega \cdot t = \Delta\theta$ Angular displacement

Acceleration vectors



$$a = \sqrt{a_t^2 + a_c^2}$$