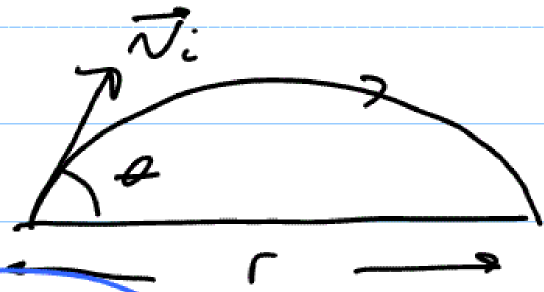
Class 7 - Oct 3/05

Projectile



$$r = \frac{v_i^2 \sin(2\theta)}{g}$$

Bullfrogs: $v_i \sim 2$ m/s

(Marsh, 1964)

$\theta \sim 30°$ (Espinaza, private communication)

$r \sim 0.35$ m

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§ 6.4 - Relative Motion

omitted from syllabus

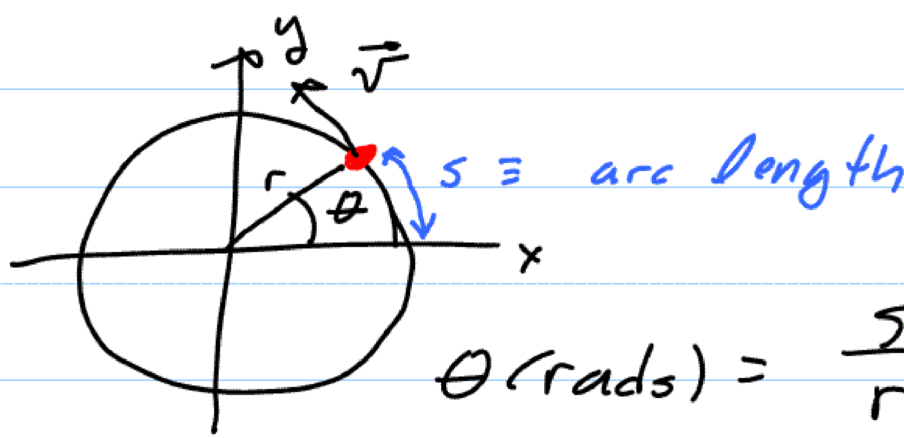
CHAPT 7 - CIRCULAR MOTION

§7.1 Uniform

constant speed

$\hat{v}$ - tangent to ⊙

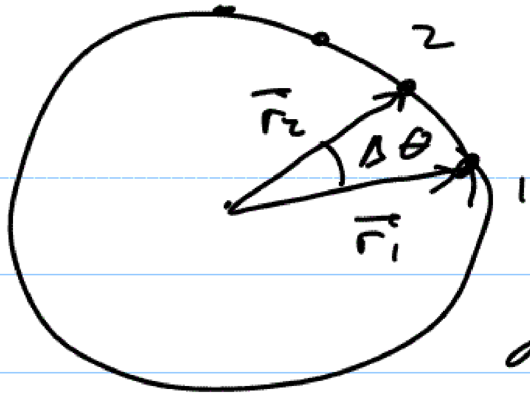
$\hat{a}$ - to centre of ⊙



$$\theta(\text{rads}) = \frac{s}{r}$$

period T - one revolution

$$v = \frac{2\pi r}{T}$$



$\Delta\theta$ = angular displacement

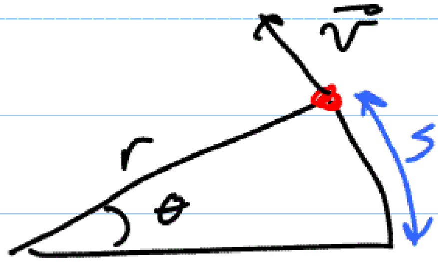
avg angular velocity: $\omega = \frac{\Delta\theta}{\Delta t}$

inst $\omega = \lim_{\Delta t \to 0} \frac{\Delta\theta}{\Delta t} = \frac{d\theta}{dt}$

> Uniform ⊙ Motion iff
> θ vs t graph
> straight line

§7.9 - Velocity & Accel

$$\vec{v} = v\hat{t}$$



$$v_t = \frac{ds}{dt}$$

$$= \frac{d(r\theta)}{dt}$$

$$v_t = r\frac{d\theta}{dt} = \boxed{r\omega = v_t}$$

$$\vec{a} = a_r\hat{r}$$

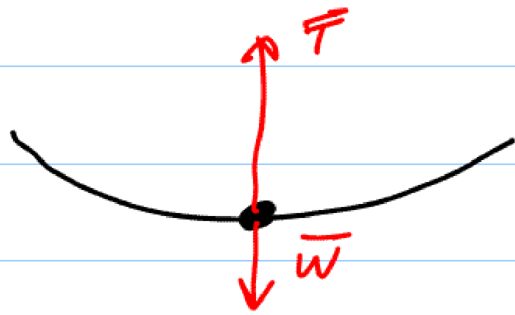
text proves!

$$\boxed{a_r = \frac{v^2}{r} = r\omega^2}$$

<u>Uniform</u>: $a_t = 0$

§ 7.3 - Dynamics

Tarzan @ bottom



$$\vec{F}_{net} = m\vec{a}$$

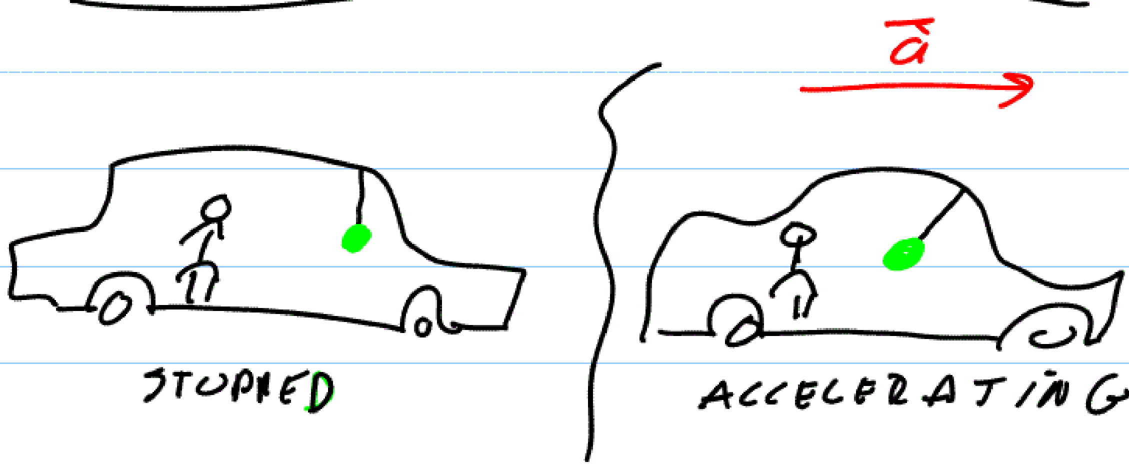
$$T - w = m\frac{v^2}{r}$$

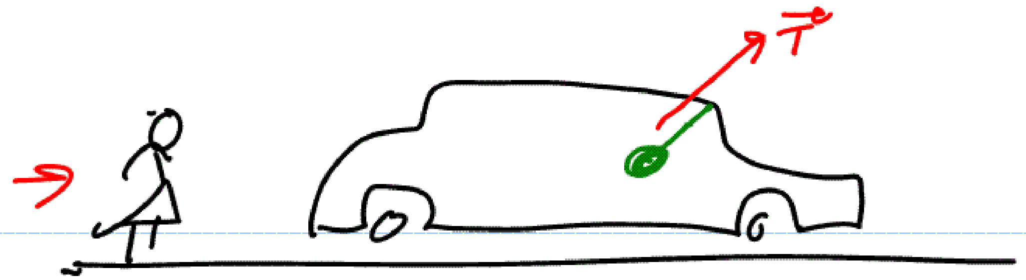
$$T = m\frac{v^2}{r} + w$$

$w = mg$

§7.4 - Circular Orbits

§7.5 - Fictitious Forces




$\vec{T}$