

# Physics 1

2017-09-14 c(v)

— questions.

— reading

— circular motion.

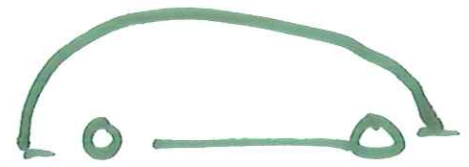
— (Grading)

units & ~~measurement~~ Fair

vectors

motion in 2d

$$= \frac{1}{2} C \rho A v^2$$



period  $T = \frac{2\pi R}{v}$

$v \equiv \sqrt{\vec{v} \cdot \vec{v}}$

angular frequency / speed

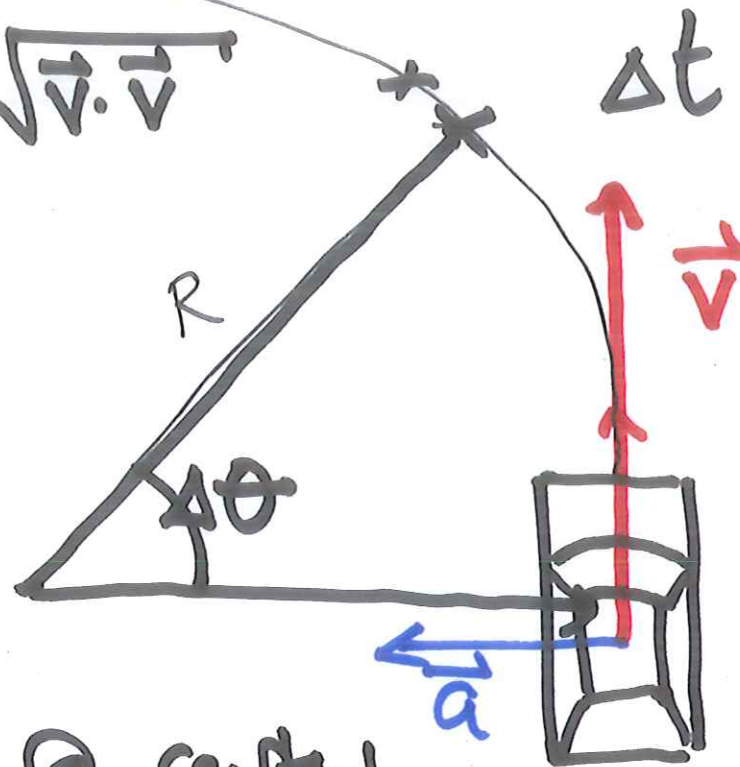
$\omega = \frac{2\pi}{T}$

$\omega = \frac{v}{R}$

units  $s^{-1}$

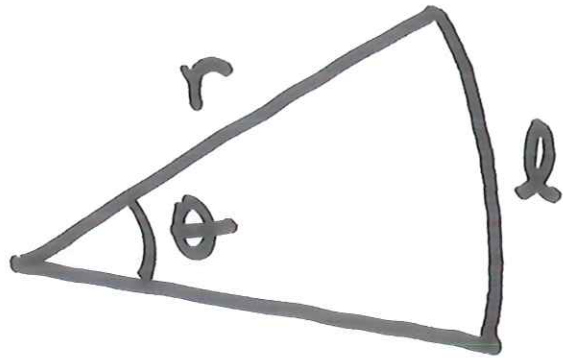
moving @ constant

speed  $\sqrt{\vec{v} \cdot \vec{v}}$



H<sub>z</sub> is only used  
for cycles  $s^{-1}$   
never rad  $s^{-1}$

What is the definition of the angle?



$$\theta \equiv \frac{l}{r}$$

angle.

dimensionless

$$\theta = \frac{l}{r} \quad \omega = \frac{d\theta}{dt} = \frac{1}{r} \frac{dl}{dt} = \frac{v}{r}$$

we have  $R, v, T, \omega$

what is the acceleration  $\vec{a}$ ?

$$\omega v$$

✓

~~$$\frac{v}{T}$$~~

ok but  
 $\frac{1}{2\pi}$

~~$$\frac{R\omega}{T}$$~~

$$\frac{v^2}{R}$$

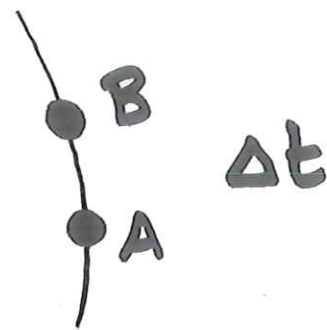
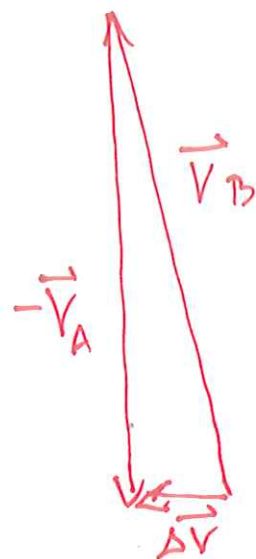
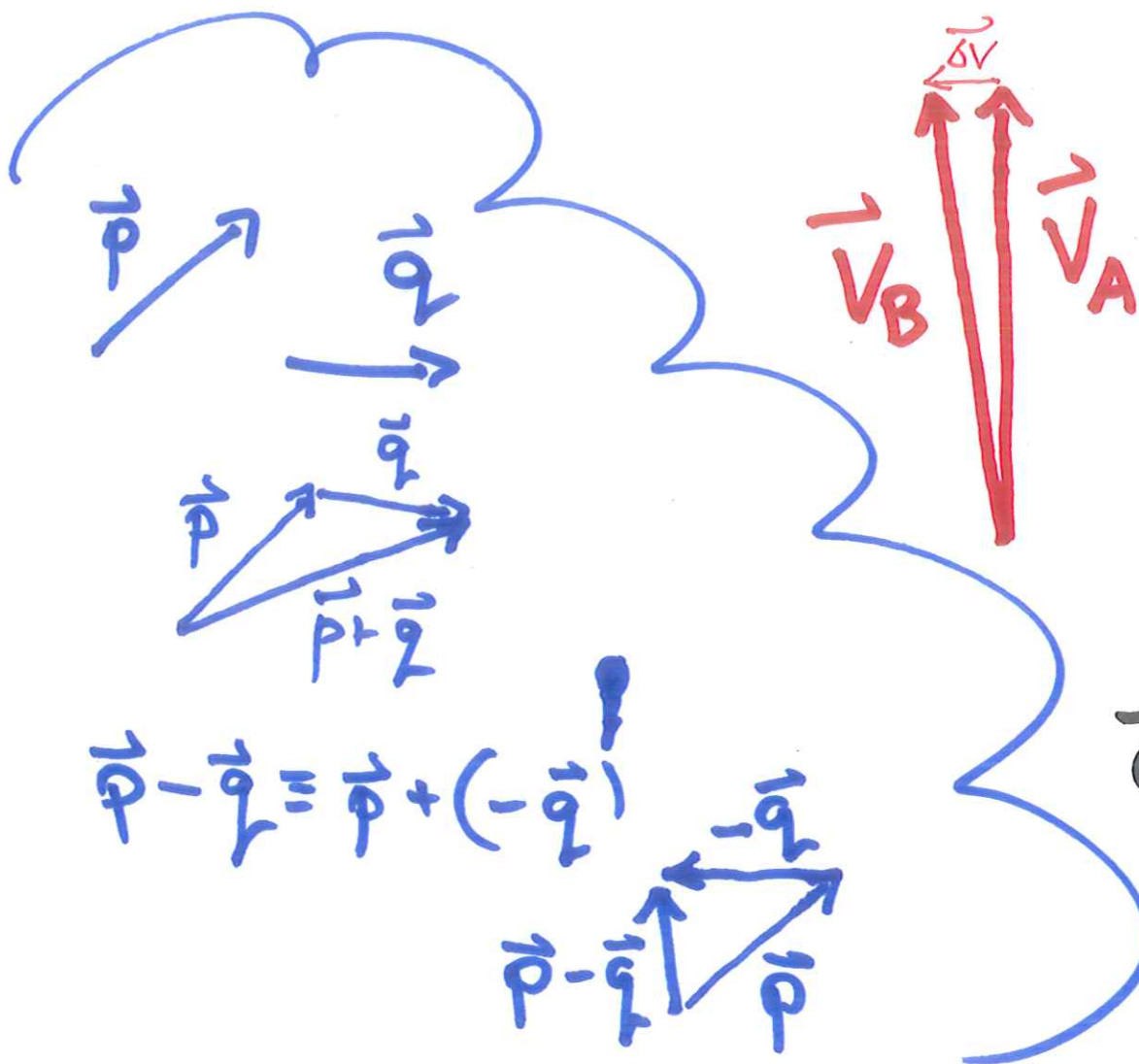
✓

~~$$\frac{R}{T^2}$$~~

$\frac{1}{2\pi^2}$

$$\vec{V}_B = \vec{V}_A + \Delta \vec{V}$$

$$\Delta \vec{V} = \vec{V}_B - \vec{V}_A$$



$$\vec{a} \equiv \frac{d\vec{v}}{dt} \equiv \lim_{\Delta t \rightarrow 0} \frac{\Delta \vec{v}}{\Delta t}$$

$$\frac{\Delta \vec{v}}{\Delta \theta}$$

$$\Delta \theta$$

$$\Delta t$$

$$a = |\vec{a}| = \sqrt{\vec{a} \cdot \vec{a}}$$

take limit

$$\textcircled{1} \Delta \vec{v} \perp \vec{v}$$

$$\textcircled{2} |\Delta \vec{v}| = |\vec{v}| \cdot \Delta \theta$$

$$= v \Delta \theta$$

$$\textcircled{3} \vec{a} \approx \frac{\Delta \vec{v}}{\Delta t}$$

$$|\vec{a}| = \frac{|\Delta \vec{v}|}{\Delta t} = \frac{v \Delta \theta}{\Delta t}$$

$$|\vec{a}| = \omega v$$

