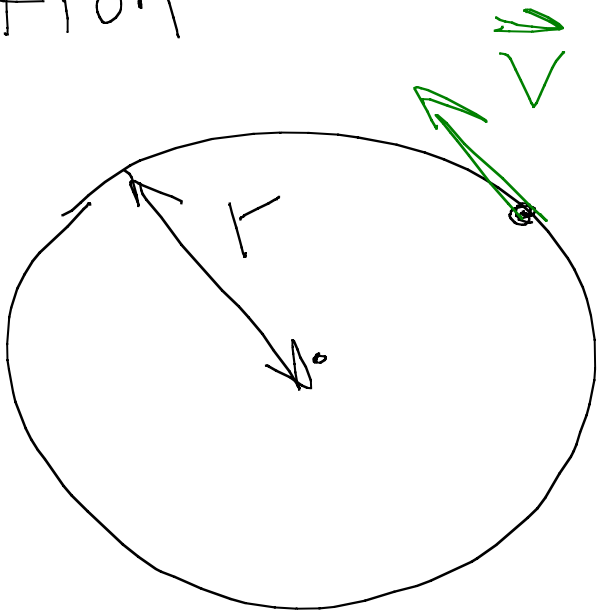
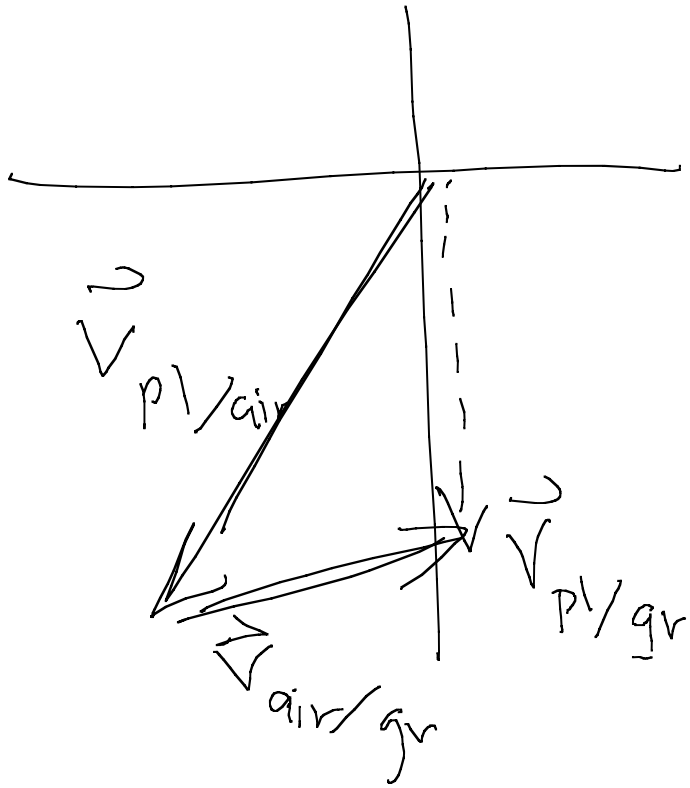
Phys 2110-3 9/20/10

Note Title 9/20/2010

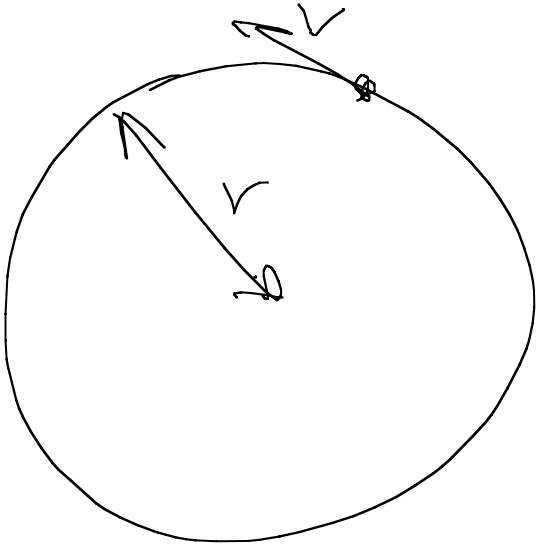
2D Motion

Uniform Circular Motion





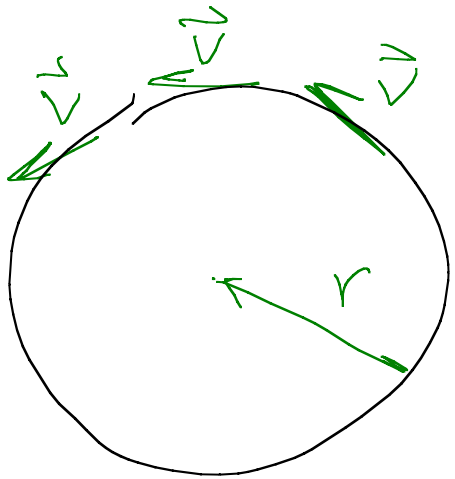
Speed stays constant



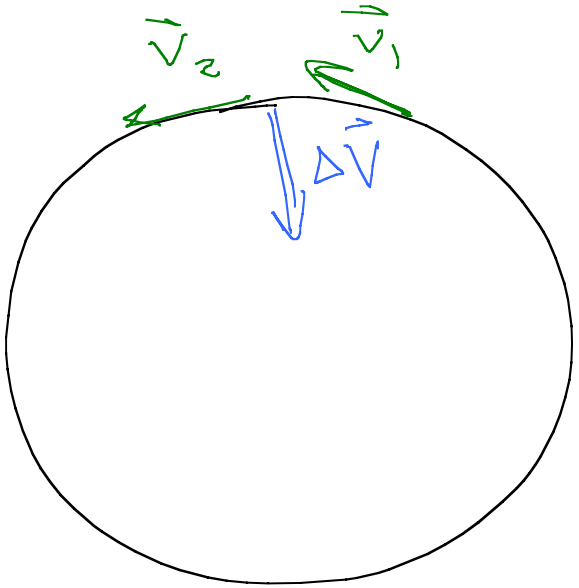
T = period of motion
= Time req'd to go around once

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

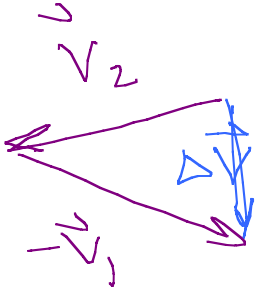
$$f = \text{freq} = \frac{1}{T} \qquad \omega = \text{ang freq} = \frac{2\pi}{T} = 2\pi f$$



It is accelerating!

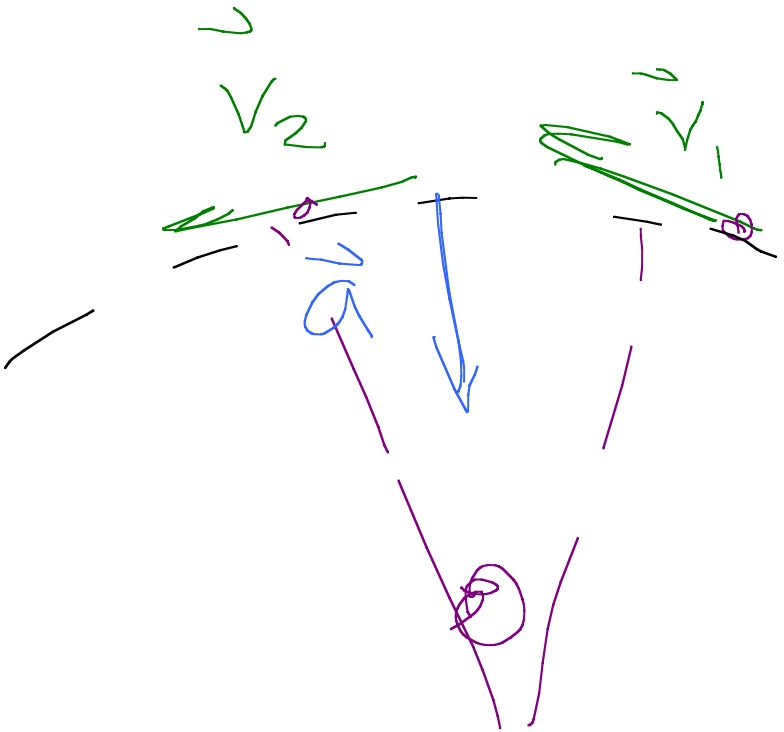


$$\Delta\vec{v} = \vec{v}_2 - \vec{v}_1 =$$



Acceleration is inward.

Centripetal

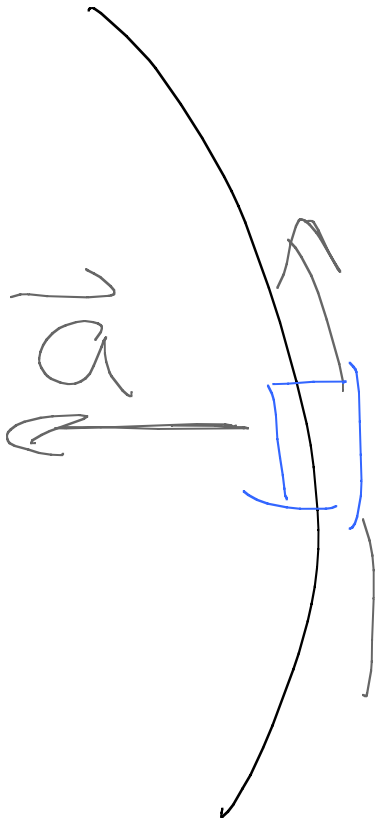


$$a_c = a = \frac{v^2}{r}$$

$$\frac{\left(\frac{m}{s}\right)^2}{m} = \frac{\frac{m^2}{s^2}}{m} = \frac{m}{s^2}$$

3.45

How fast car go to round turn of radius 75 m for its accel to numerically equal that grav.?



$$a = \frac{v^2}{r} = \left(9.8 \frac{m}{s^2}\right)$$

$$v^2 = r\left(9.8 \frac{m}{s^2}\right) = (75\,m)\left(9.8 \frac{m}{s^2}\right)$$

$$v = 27.1 \frac{m}{s}$$

Non-uniform circ motion

v not const