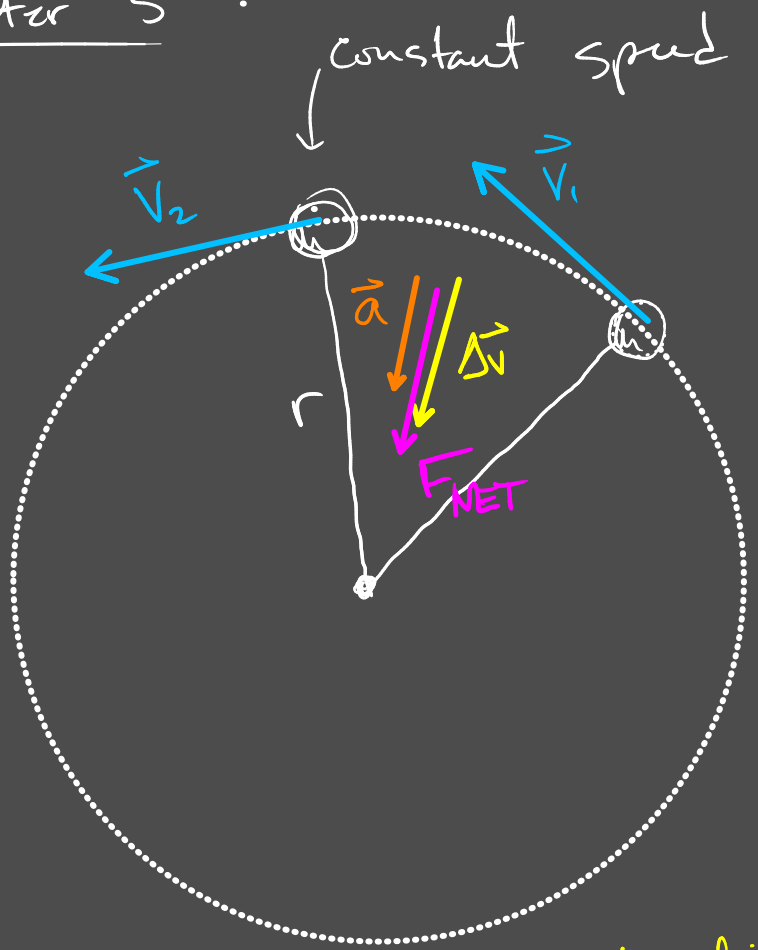
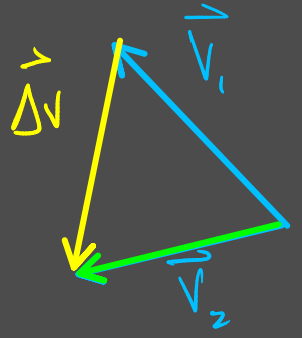
Chapter 5

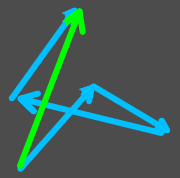


centripetal acceleration

$$a_c = \frac{\text{speed}^2}{\text{radius}}$$

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





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

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

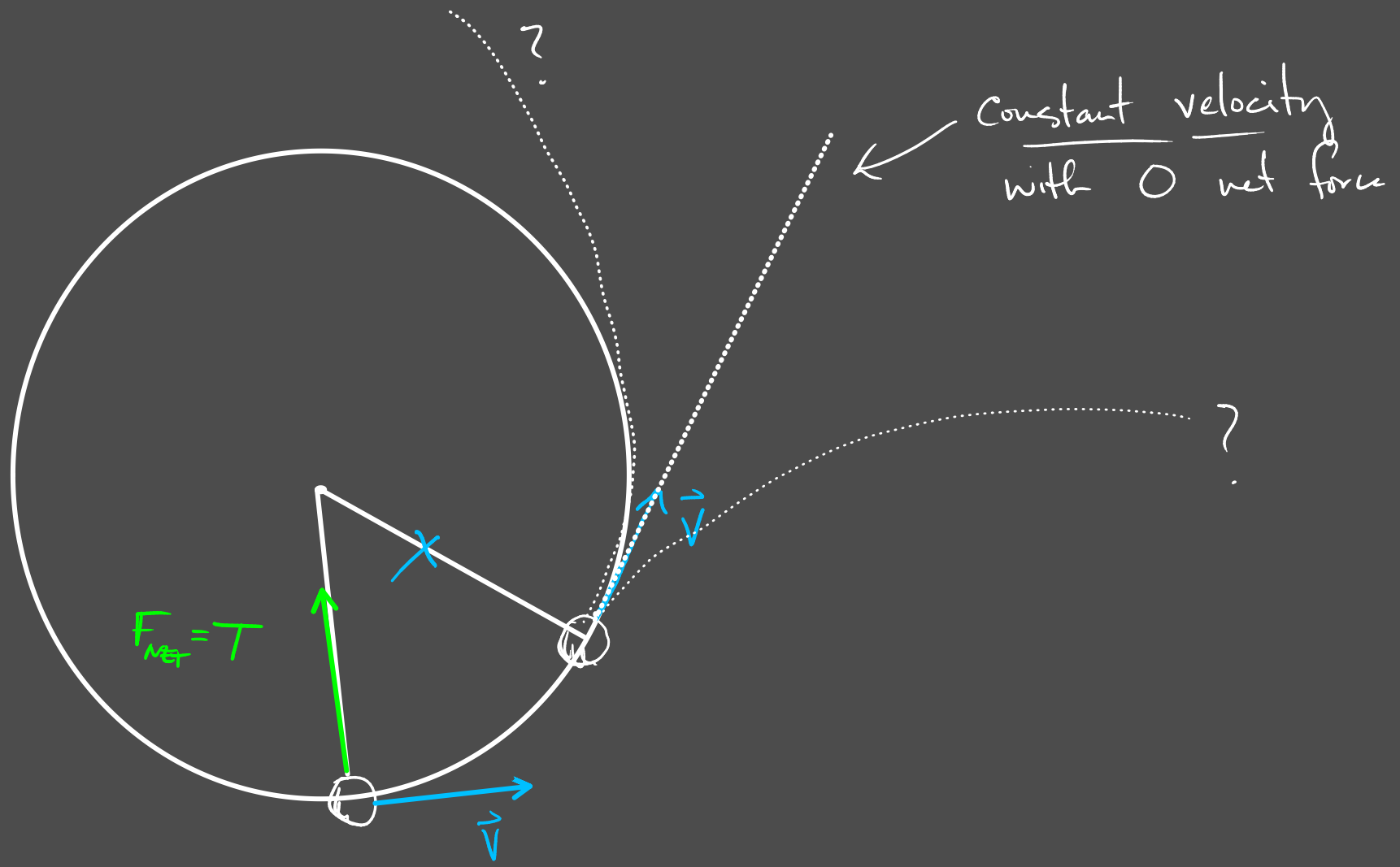
$$\vec{F}_{NET} = m\vec{a}$$

provided by tension

centripetal net force

$$F_c = ma_c$$

$$\boxed{F_c = \frac{mv^2}{r}}$$

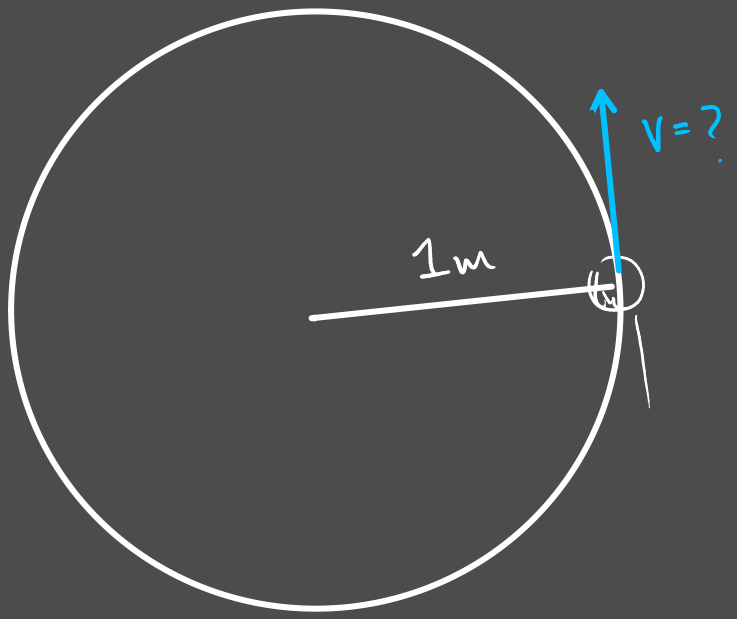

?
Constant velocity
with 0 net force
?
$\vec{V}$
$F_{Net} = T$
$\vec{V}$

$m = 0.1\ kg$

$r = 1\ m$

$t = 0.5\ s$ → one complete revolution

$v = ?$



$$C = 2\pi r$$

$$C = 2\pi (1\ m)$$

$$C = 6.28\ m$$

$$v = \frac{d}{t} = \frac{6.28\ m}{0.5\ s} = 12.56\ m/s$$

$$F_c = ma_c = \frac{mv^2}{r} = \frac{0.1\ kg \cdot (12.56\ m/s)^2}{1\ m} = 15.8\ N$$

$$T = F_{NET} = 15.8\ N$$