so, $\vec{a}_{inst} = \frac{v}{R} \lim_{\Delta t \to 0} \frac{s}{\Delta t}$

and $s = v \Delta t$

so $\vec{a}_{inst} = \frac{v}{R} \lim_{\Delta t \to 0} \frac{v \cancel{\Delta t}}{\cancel{\Delta t}}$

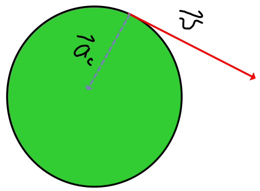
$$= \frac{v}{R}(v)$$

so $\boxed{a_c = \frac{v^2}{R}}$ constant speed

centripetal acceleration

radius of turn

(always towards to centre of the circular path)



Now $\Delta d = 2\pi r$, (for circle)

so $a_c = \frac{v^2}{r} = \frac{\left(\frac{\Delta d}{\Delta t}\right)^2}{r}$

$$= \frac{\left(\frac{2\pi r}{\Delta t}\right)^2}{r}$$

$$= \frac{\left(\frac{4\pi^2 r^{\cancel{2}}}{\Delta t^2}\right)}{\cancel{r}}$$

$\boxed{a_c = \frac{4\pi^2 r}{T^2}}$ period

or

$\boxed{a_c = 4\pi^2 r f^2}$ frequency

P. 122 #1,2

P. 123 #3

P. 126 #6-10, P. 127 #5-7