The period, T, of rotational motion is the time required for one complete revolution, or the time for the object to rotate through $2\pi \ rad$. Starting with angular displacement = average angular speed time interval, show that $T = 2\pi * \frac{r}{v}$

Solution:

angular displacement = average angular speed time interval:

$$\phi = \omega * t$$

For complete rotation:

$$t = T$$

$$\phi = 2\pi \ rad$$

Thus

$$2\pi = \omega * T$$

Angular speed related to linear speed as:

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

So:

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

Finally:

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