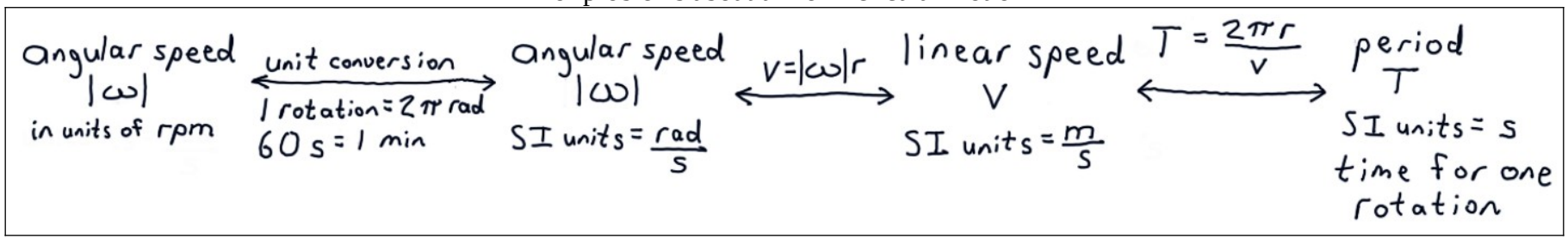
useful formulas
for problems about uniform circular motion



The linear speed is the magnitude of the linear velocity.
Linear velocity is symbolized as $\vec{v}$. Linear speed is symbolized as v.

The angular speed is the magnitude of the angular velocity.
Angular velocity is symbolized by ω, and angular speed is symbolized by |ω|.

If we assume that the object's direction of rotation is the "positive direction", then the angular velocity will be positive. In that case, the angular speed |ω| will equal the angular velocity ω. Therefore, in the context of uniform circular motion, for the sake of simplicity, many professors do not distinguish carefully between angular velocity and angular speed. So, many professors would use the formula $v=\omega r$, rather than $v=|\omega|r$.

The formula $v = |\omega|r$ only works when |ω| is measured using radian-based units, such as radians per second or radians per minute.
The $v = |\omega|r$ formula does not work if |ω| is measured in rpm.