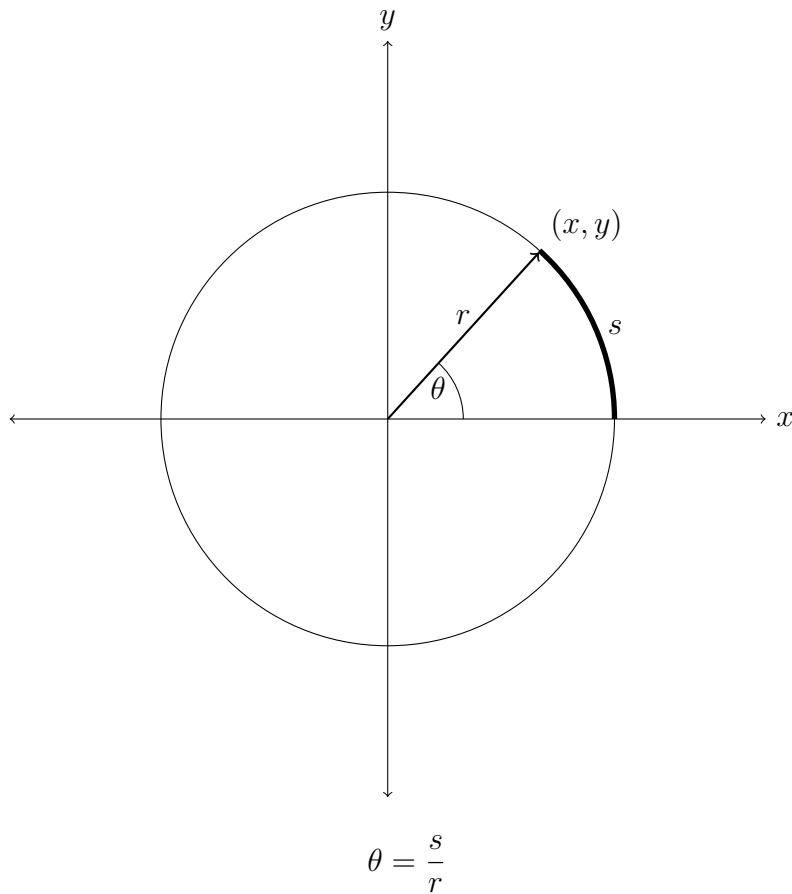


University Physics 1A

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Angular Motion



Kinematics vs Rotational Motion

position	x	average position	θ
average velocity	$\frac{\Delta x}{\Delta t}$	average angular velocity	$\omega_{avg} = \frac{\Delta \theta}{\Delta t}$
instantaneous velocity	$\frac{dx}{dt} = v$	instantaneous angular velocity	$\omega = \frac{d\theta}{dt}$
acceleration	$a = \frac{dv}{dt}$	average acceleration	$\alpha = \frac{d\omega}{dt}$

$$s = r\theta$$

$$\frac{ds}{dt} = r \frac{d\theta}{dt} = r\omega = v$$

$$a_{centripetal} = \frac{v^2}{r} = \frac{r^2\omega^2}{r} = r\omega^2$$

$$a_{tangential} = \alpha r$$

θ and $\Delta\theta$ are not vectors. ω and α are vectors.

Linear \longleftrightarrow Rotational

$$v = \frac{dx}{dt} \longleftrightarrow \omega$$

$$a = \frac{dv}{dt} \longleftrightarrow \alpha$$

Constant Acceleration

$$x = x_0 + v_0t + \frac{1}{2}at^2$$

$$v = v_0 + at$$

$$v^2 = v_0^2 + 2a\Delta x$$

Constant α

$$\theta = \theta_0 + \omega_0t + \frac{1}{2}\alpha t^2$$

$$\omega = \omega_0 + \alpha t$$

$$\omega^2 = \omega_0^2 + 2\alpha\Delta\theta$$

You can find all my notes at <http://omgimanerd.tech/notes>. If you have any questions, comments, or concerns, please contact me at alvin@omgimanerd.tech