MOTION EQUATIONS FOR ROTATION

● Just like in linear motion, there are 4* equivalent MOTION equations for Rotation. Same equations, different letters.

- You often use these when given a lot of rotational quantities. Same process: List variables, pick equation, solve.

LINEAR EQUATIONS	ROTATIONAL EQUATIONS
$v_f = v_i + a\,t$	
$v_f^{\,2} = v_i^{\,2} + 2\,a\,\Delta x$	
$\Delta x = v_i\,t + \frac{1}{2}\,a\,t^{\,2}$	
$\Delta x = \frac{1}{2}\,(v_i + v_f)\,t$ *	

EXAMPLE 1: A wheel initially at rest accelerates around its central axis, with a constant 4 rad/s² until it reaches 80 rad/s. **(a)** By the time it reaches 80 rad/s, how many degrees will it have rotated through? **(b)** How long (in s) does this take?

EXAMPLE 2: A very heavy disk, 20 m in radius, takes 1 hour to make a complete revolution, accelerating from rest at a constant rate. What rotational velocity will the disk have 1 hour after it starts accelerating?

PRACTICE: MOTION EQUATIONS FOR ROTATION

PRACTICE**:** A tiny object spins with 5 rad/s around a circular path of radius 10 m. The object then accelerates at 3 rad/s^2**.** Calculate its angular speed 8 s after starting to accelerate. → BONUS**:** Calculate its *linear* displacement in the 8 s**.**

PRACTICE: MOTION EQUATIONS FOR ROTATION

PRACTICE**:** The turntable of a DJ set is spinning at a constant rate just before it is turned off. If the turntable decelerates at 3 rad/s² and goes through an additional 30 rotations before stopping, how fast (in RPM) was the turntable initially spinning**?**

→ BONUS**:** How long (in seconds) does the turntable take to stop**?**