

TYPES OF ACCELERATION IN ROTATION

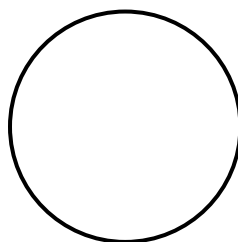
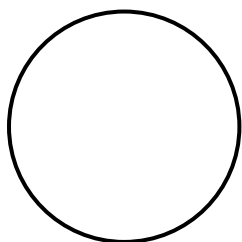
- There are FOUR types of acceleration in rotation problems →

- Centripetal / Radial	(linear)	_____
- Tangential	(linear)	_____
- Total / Acceleration	(linear)	_____
- Rotational / Angular		_____

- BUT some exist only if you're accelerating (spinning faster):

- You always have v_T , a_c (aka a_{RAD}), and ω :

- IF accelerating: you also have a_T and α :



- a_c _____.

- a_T (and α) _____.

- The equation $a_T = r \alpha$ is a way to remember that a_T and α are connected. If one is zero, the other has to be zero.

- Note that IF $a_T = 0$, then $a =$ _____ becomes $a =$ _____ = a_c .

EXAMPLE 1: A carousel 10 m in radius completes one cycle every 45 s. A boy stands at the edge of the carousel. Find his:

- Tangential velocity
- Angular acceleration
- Radial acceleration
- Tangential acceleration
- Total linear acceleration

EXAMPLE 2: A carousel 16 m in radius accelerates from rest with 0.05 rad/s^2 . A boy stands at the edge of the carousel.

After the carousel has accelerated for 10 s, calculate the boy's:

- Tangential velocity
- Tangential acceleration
- Radial acceleration
- Angular acceleration
- Total linear acceleration

PRACTICE: ROTATIONAL KINEMATICS

PRACTICE: A large disc of radius 10 m initially at rest takes 200 full revolutions to reach 30 RPM. Calculate the total linear acceleration of a point at half way between the disc's center and its edge, once the disc reaches 30 RPM.
(You may assume it continues accelerating past that point)

PRACTICE: ROTATIONAL KINEMATICS

PRACTICE: An object of negligible size moves in a circular path of radius 20 m with 90 RPM. Find its radial acceleration.