

1 Class Handout - Rotational Motion

1. A Merry-Go-Round initially at rest is angularly accelerated at a rate $\alpha = 4\frac{rad}{s^2}$ for a time of 5 seconds. Find its angular velocity.

2. An ice skater spinning at a rate of $\omega = 3\frac{rad}{s}$ pulls in her arms, lowering her moment of inertia from $I = 10kgm^2$ to $I = 4kgm^2$. Find her new angular velocity.

3. A spherical ball rolls down an inclined plane $5m$ high without slipping. What is its speed at the bottom? $I_{sphere} = \frac{2}{5}MR^2$.

4. A Merry-Go-Round has a mass of $300kg$ and a radius of $3m$ is initially at rest. If children supply a torque of $1350Nm$, what will its angular velocity be after 10 seconds? What will be the centripetal acceleration a child at the end of the Merry-Go-Round? $I_{disk} = \frac{1}{2}MR^2$.