W14D1-1 Torque on a Gyroscope

A wheel is at one end of an axle of length $d$. The axle is horizontal. The wheel is set into motion so that it executes uniform precession; that is, the wheel’s center of mass moves with uniform circular motion. The wheel has mass $M$ and moment of inertia $I_{cm}$ about its central axis, through its center of mass. Its spin angular velocity has magnitude $\omega$ and is directed as shown in the figure below. Find the magnitude and direction of the torque about the pivot point in terms of the other parameters.