8. Because there is no net external torque, the angular momentum of the system is conserved. This means the value of the angular momentum before the mass was moved closer to the axis must be equal to the value of the angular momentum after the mass is moved. The mass was moved closer to the axis resulting in a reduction of the moment of inertia, so we expect that the angular velocity should be increased.

$$L_1 = L_2$$

$$I_1 \omega_1 = I_2 \omega_2$$

$$(2.0 \text{ kg m}^2)(3.0 \text{ rad / s}) = (1.5 \text{ kg m}^2)\ \omega_2$$

$$\omega_2 = (2.0 / 1.5)(3.0 \text{ rad / s}) = 4.0 \text{ rad / s}$$