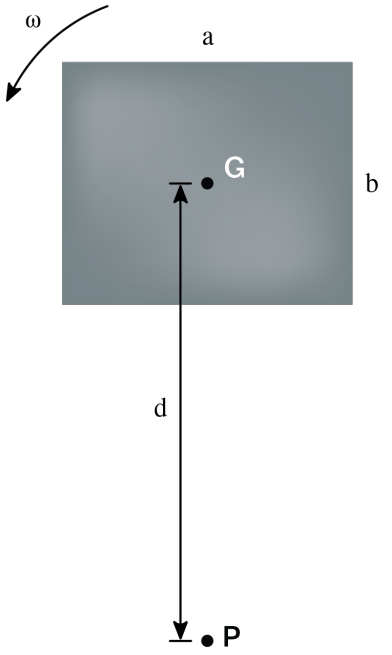
If a rectangular plate has dimensions $a = 4m, b = 3m$ what is the difference in kinetic energy if it is rotating about its center of gravity G, comparatively to rotating about the point P which is a distance $d = 6.5m$ away. In both cases, the plate has an angular velocity of $\omega = 3\ rad/s$ and has a mass $m = 14kg$.



① Spinning about G

$T_G = \frac{1}{2} I_G \omega^2$

$I_G = \frac{1}{12} m(a^2+b^2) = \frac{1}{12}(14kg)(4m^2+3m^2)$

$I_G = 29.2\ kgm^2$

$T_G = \frac{1}{2}(29.2\ kgm^2)(3\ rad/s)^2$

$T_G = 131.25J$

② Spinning about P

$T_P = \frac{1}{2} I_P \omega^2$

$I_P = \frac{1}{12} m(a^2+b^2) + md^2 = \frac{1}{12}(14kg)(4m^2+3m^2) + (14kg)(6.5m)^2$

$I_P = \frac{1862}{3}\ kgm^2 = 620.7\ kgm^2$

$T_P = \frac{1}{2}(620.7\ kgm^2)(5\ rad/s)^2 = 2793\ J$

$\Delta T = |T_P - T_G| = |2793J - 131J| = \boxed{2661\ J = \Delta T}$