For a solid occupying the region E on the xyz space and having density function $\rho(x, y, z)$, its moments of inertia about the three coordinate axes are given by the following formulas:

$$I_x = \iiint_E (y^2 + z^2)\rho(x, y, z)dV \tag{1}$$

$$I_y = \iiint_E (x^2 + z^2)\rho(x, y, z)dV \tag{2}$$

$$I_z = \iiint_E (x^2 + y^2)\rho(x, y, z)dV. \tag{3}$$

You do not need to memorize these formulas for quizzes or exams.