HW 9-6 Soln)

For the x-axis, the distance of each mass from the x-axis is its y-coordinate.

$$I_x = \sum_n m_n r_n^2 = \sum_n m_n y_n^2 = 3(4^2) + 5(4^2) + 3(2^2) + 2(2^2) = 148 \text{ kg m}^2$$

For the y-axis, the distance of each mass from the y-axis is its x-coordinate.

$$I_x = \sum_n m_n r_n^2 = \sum_n m_n x_n^2 = 3(2^2) + 5(2^2) + 3(2^2) + 2(2^2) = 52 \text{ kg m}^2$$

For the z-axis, the distance squared of each mass from the z-axis is $(x^2 + y^2)$.

$$I_z = \sum_n m_n r_n^2 = \sum_n m_n (x_n^2 + y_n^2) = 3(4^2 + 2^2) + 5(4^2 + 2^2) + 3(2^2 + 2^2) + 2(2^2 + 2^2)$$
$$= 200 \text{ kg m}^2$$

Note that the sum of the answers from a) and b) equals the answer from c).
This is consistent with the *perpendicular axis theorem*.