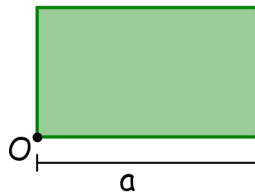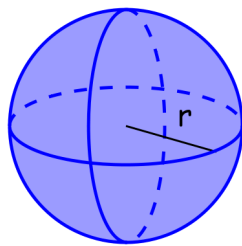# HOMEWORK ON INERTIA:
EXAMPLES WITHOUT MATERIAL SYMMETRIES
AND EXAMPLES IN 3D

Problem 1. Fin the principal axes of inertia (= principal directions) of a rectangle with dimensions a an b at one vertex O:
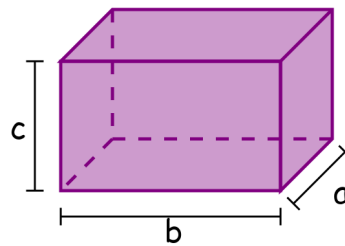

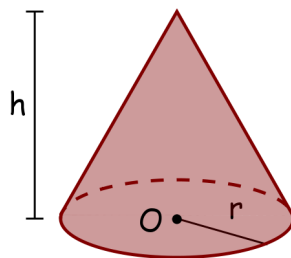**Problem 2.** Find the principal central moments of inertia of
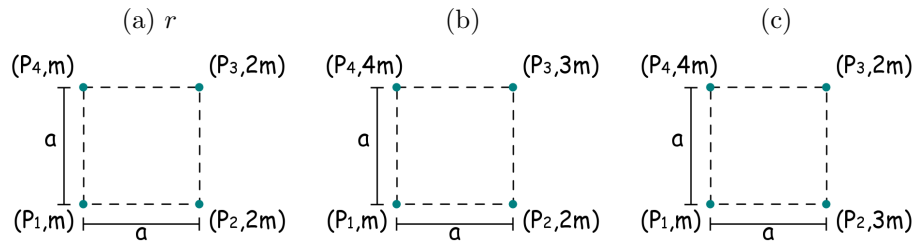
(a) a sphere with radius r:

(b) a rectangular parallelepiped with dimensions a, b and c:

Problem 3. Find the principal moments of inertia at the point O of a cone with radius r and height h:

Problem 4. Find the center of mass and the principal central axes of inertia of the following configurations of 4 points:

(a) r

(P₄,m)   (P₃,2m)

a

(P₁,m)   a   (P₂,2m)

(b)

(P₄,4m)   (P₃,3m)

a

(P₁,m)   a   (P₂,2m)

(c)

(P₄,4m)   (P₃,2m)

a

(P₁,m)   a   (P₂,3m)

Problem 5. Find the principal central moments of inertia of the following system made of 2 vertical segments with mass $2m$ and length $2a$ and 2 horizontal segments with mass m and length a:

a,m

2a,2m   a,m   2a,2m