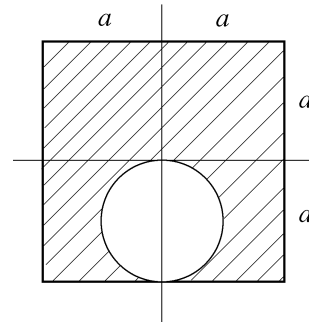


AT Physics \diamond Center of Mass Problems

1. Find the center of mass of a square uniform lamina with a circular hole in it, as shown to the right. Assume each side to have a length $2a$ and the hole to have a radius $a/2$.



2. A rod of length l lies along the x axis with one end at the origin. Assume that the mass per unit length λ of the rod is given by $2mx/l^2$.
- Find by integration the total mass of the rod.
 - Find by integration the x coordinate of its center of mass.
 - Is there any relationship between this problem and that of finding the c.m. of a uniform right triangle?

3. Using the result that the center of mass (called *centroid* in mathematics) of a right triangle is one-third of the way up from each of the two perpendicular sides, show that the center of mass of a scalene triangle is along a line parallel to each base a distance of one-third of the altitude drawn from that base. This result is equivalent to the statement that the centroid of a triangle is at the intersection of the medians drawn to each side a distance two-thirds the distance from each vertex to the midpoint of the opposite side.

