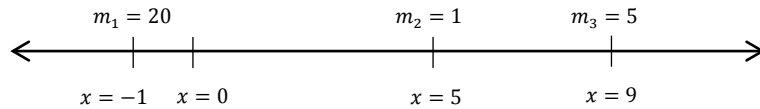


## Homework Set 25

(sect 7.5: Centroids)

1. Point-masses  $m_i$  are located on the  $x$ -axis (see below). Find the moment  $M$  and the center of mass  $\bar{x}$ .



2. The masses  $m_1 = 6$ ,  $m_2 = 5$ ,  $m_3 = 1$ ,  $m_4 = 4$  are located at the points  $P_1 = (1, -2)$ ,  $P_2 = (3, 4)$ ,  $P_3 = (-3, -7)$ ,  $P_4 = (6, -1)$ . Find the moments  $M_x$  and  $M_y$  and the center of mass of the system  $(\bar{x}, \bar{y})$ .

3. Find the centroid of the region bounded by  $y = x + 2$  and  $y = x^2$ .

4. Consider the region in the first quadrant bounded by  $y = 4 - x^2$  and the axes.
- Sketch the region bounded by the curves, and find the area of this region.
  - Find the exact coordinates of the centroid and mark it on the graph.
  - Find the number  $h$  such that the line  $y = h$  cuts the region in part (a) into 2 regions which have equal areas. (hint: integrating with respect to  $y$  could be helpful)

5. Calculate the moments  $M_x$  and  $M_y$  and the centroid of the given shape where  $\rho = 2$ .

