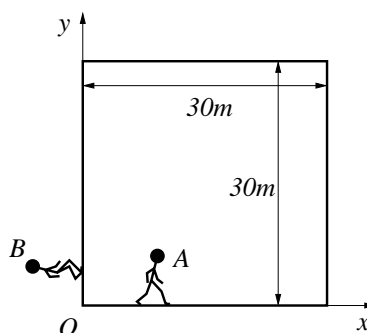


Problem 2 (15pts) Two walkers:

Two persons start from the same location  $O$  and walk around a square in opposite directions with constant speeds. The square is 30m by 30m. A's speed is 2m/s and B's speed is 1m/s.

- (a) Find the coordinates of the point where A and B will meet for the first time.
- (b) Find the distance between the meeting place and the origin  $O$ .
- (c) Find the average velocity  $\vec{V}_A$  of A and the average velocity  $\vec{V}_B$  of B between the time when they first start and the time when they first meet.  
(Either give the components of  $\vec{V}_A$  and  $\vec{V}_B$  or their magnitudes and directions.)



Solution:

- (a) To meet A travels 80m and B travels 40m. They meet at  $(10m, 30m)$ .
- (b) The distance is  $\sqrt{10^2 + 30^2} = 10\sqrt{10}m$ .
- (c) The average velocities of A and B are the same since they have the same net displacement during the same time. A and B traveled for  $\frac{40m}{1m/s} = 40s$ . Thus  $\vec{V}_A = \vec{V}_B = \frac{(10,30)m}{40s} = (0.25m/s, 0.75m/s)$ .