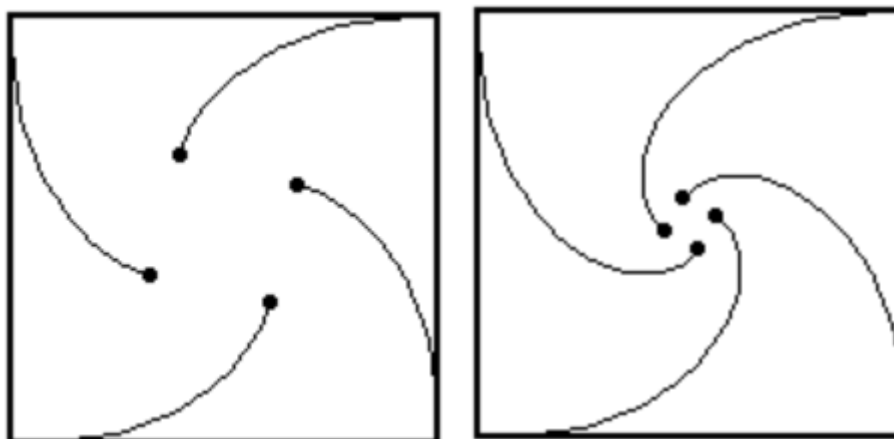


## Answer on Question #48565, Physics, Mechanics | Kinematics | Dynamics

Four persons P,Q,R, and S are initially at the four corners of a square of side  $d$ . Each person now moves with a constant speed  $v$  in such a way that P always moves directly towards Q, Q towards R, R towards S, and S towards P. The four persons will meet after time?

1.  $d/2v$
2.  $d/v$
3.  $3d/2v$
4. They will never meet

**Solution:**



Symmetry is very important here. Due to the symmetry of the arrangement, the persons will always be arranged at the corners of a square.

The square will rotate and shrink, and the persons will spiral into the center of the original square. Each person's path is perpendicular to the person's path on its right. A person will reach the person on its right in the same time it would take if the person on the right had not moved.

As you can see directly from the figure, the rate of the shrinkage of the side will be the persons' constant speed  $V$ , so we can write  $S = d - vt$  for the length of the side  $S$  as a function of time with the initial side length  $d$ . The shape does not change, but the side of the square shrinks in a linear fashion with time, and they meet at the center at

$$t = \frac{d}{v}$$

**Answer:** 2.  $d/v$