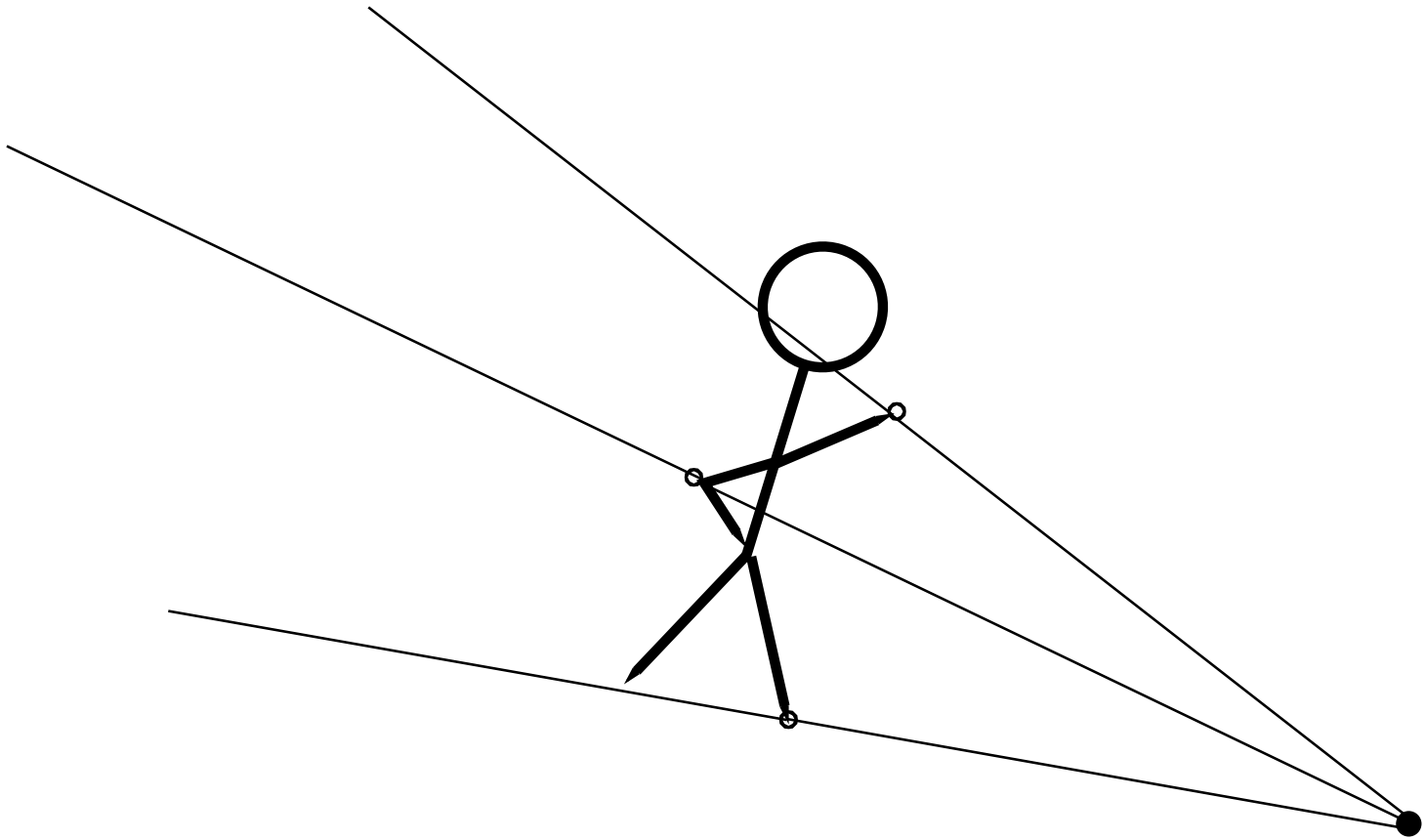
Definition, page 92

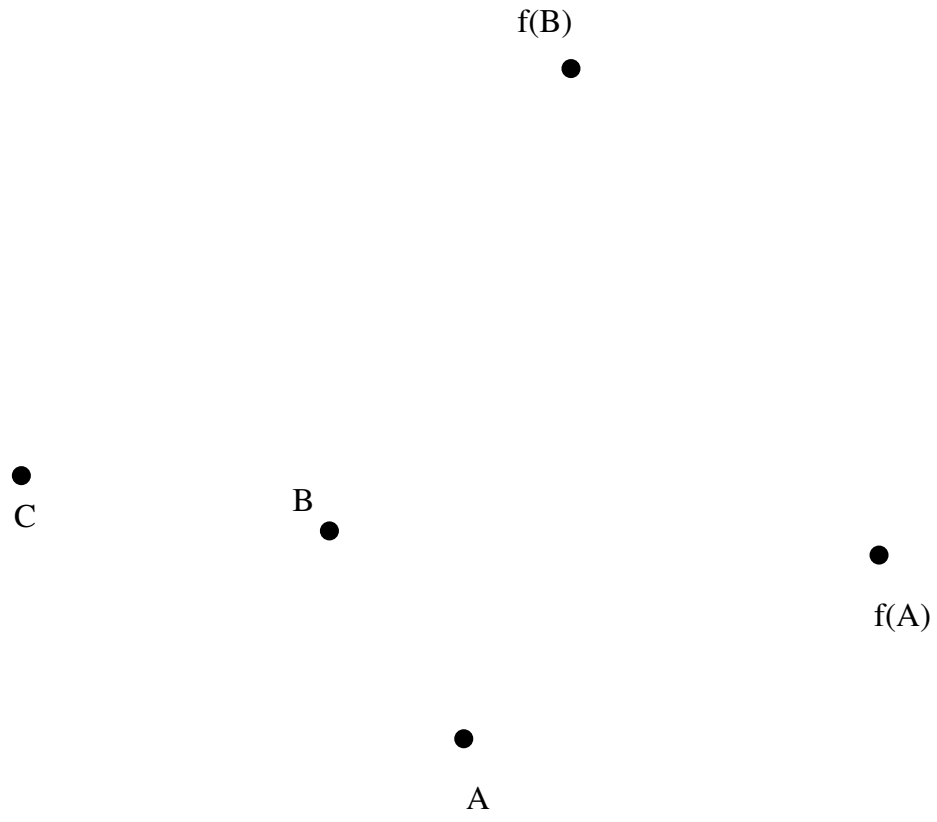
A plane transformation f is a *similarity* if there exists a positive number α such that for any two points A and B on the plane, we have $f(A)f(B) = \alpha AB$.

The number α is the stretching factor of the similarity.

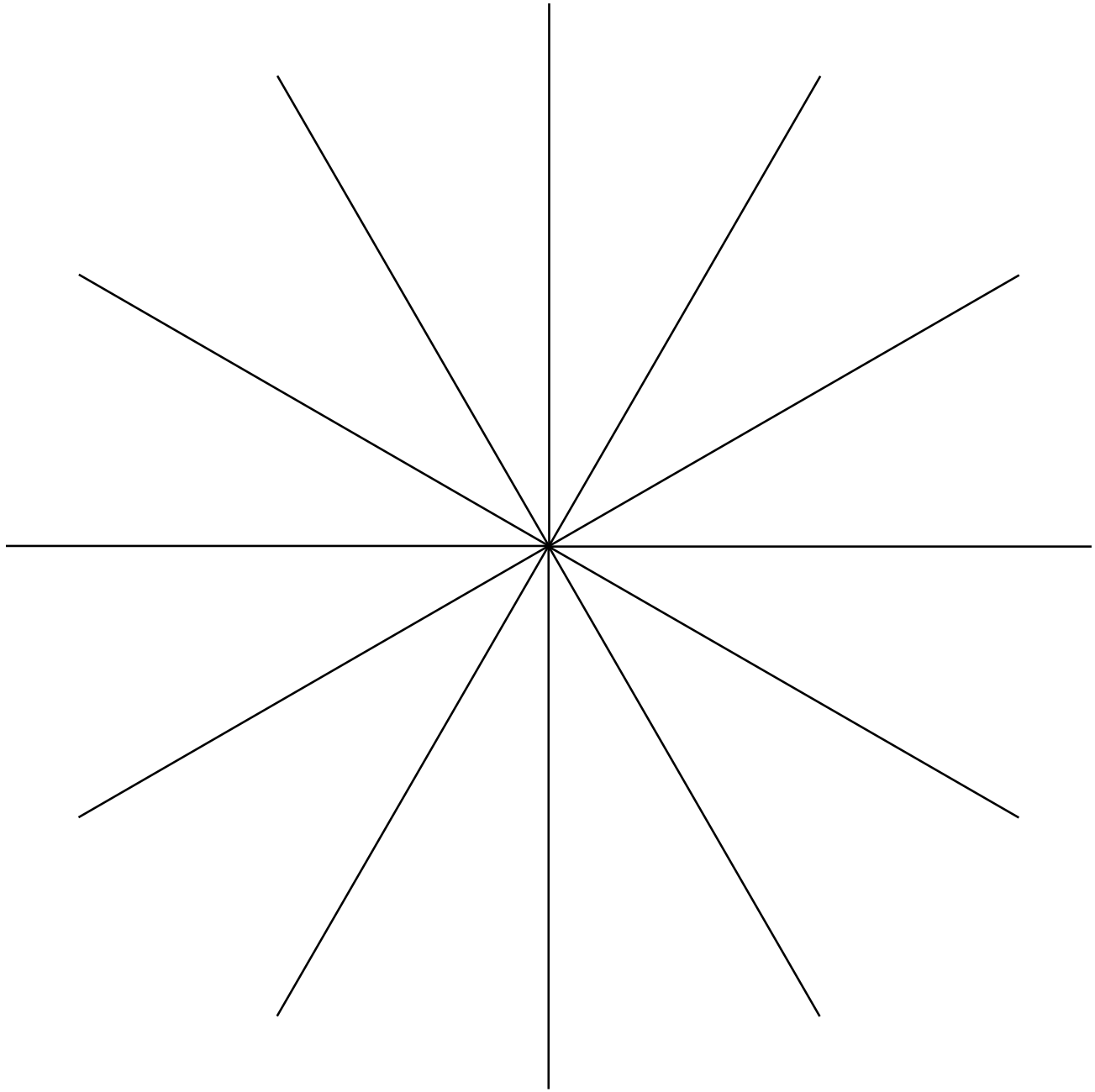
Central Similarities (Dilations)



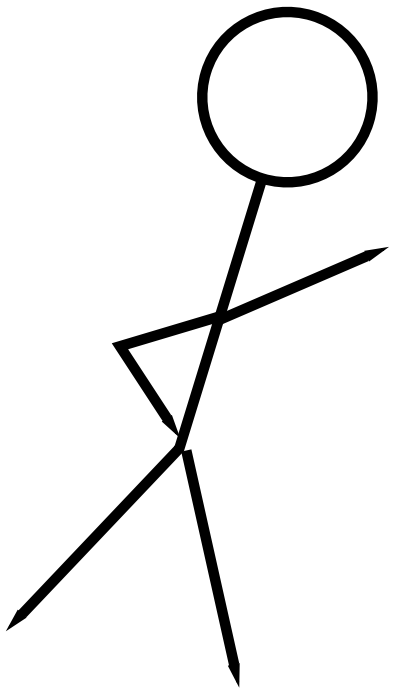
Find the center of the central similarity f, and find the image of C under f.

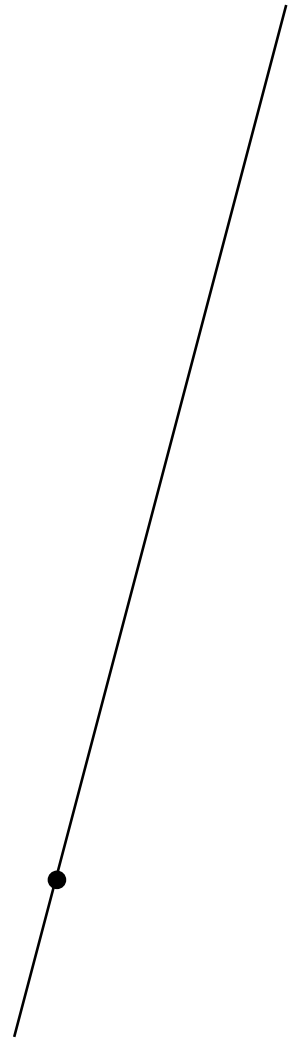


Spiral similarity



Dilative reflection





Classification Theorem for Similarities

Every similarity is a symmetry, a spiral similarity, or a dilative reflection.

Similar objects

Two objects are *similar* if they have the same shape, regardless of orientation.

Which of these objects are always, never, or sometimes similar?

- two rectangles having the same area
- two golden triangles
- two isoceles triangles with different heights
- two isoceles triangles with the same height
- two golden obtuse triangles having different heights
- two circles of different diameters
- two pentagons

Squaring transformation

Circle Inversion