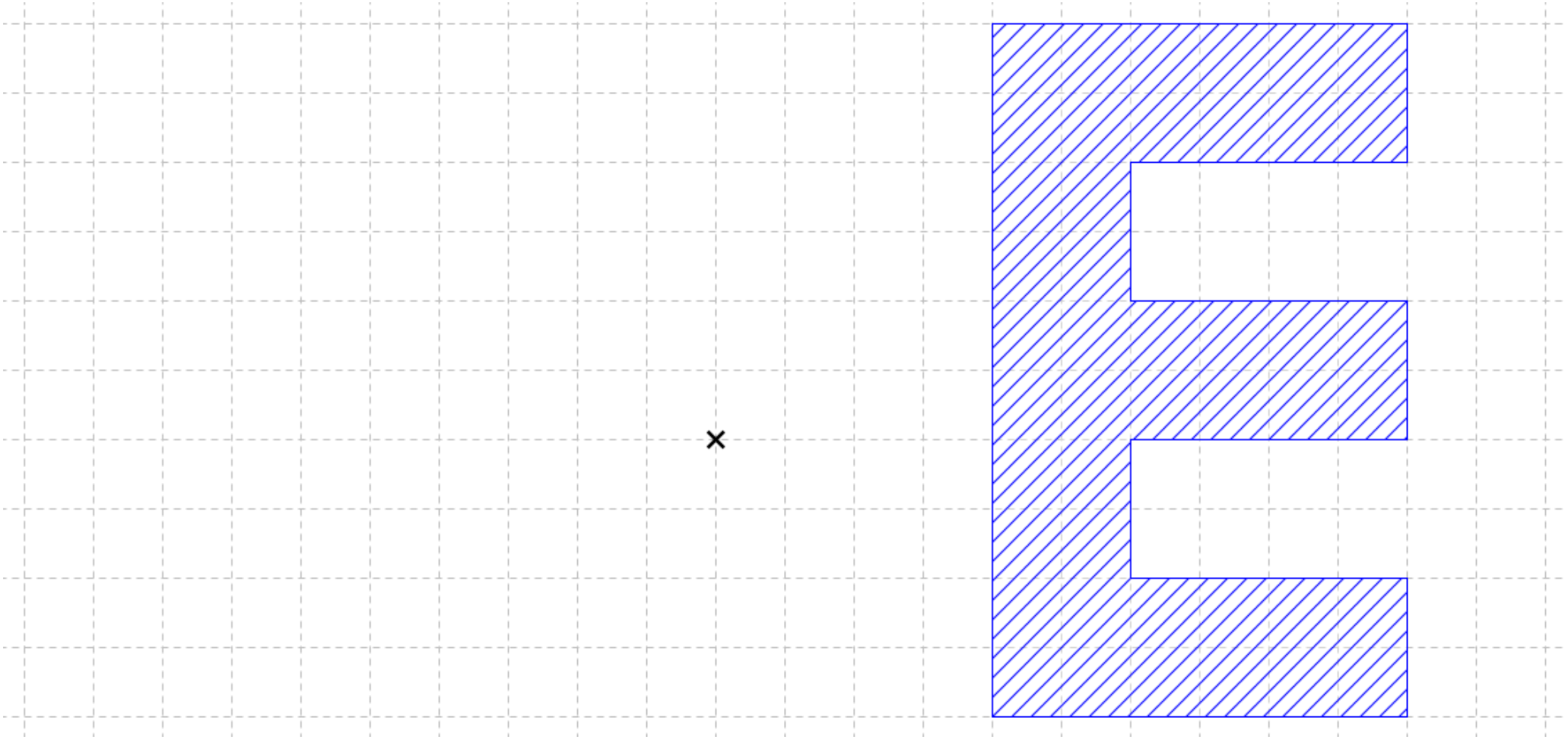
Enlargement

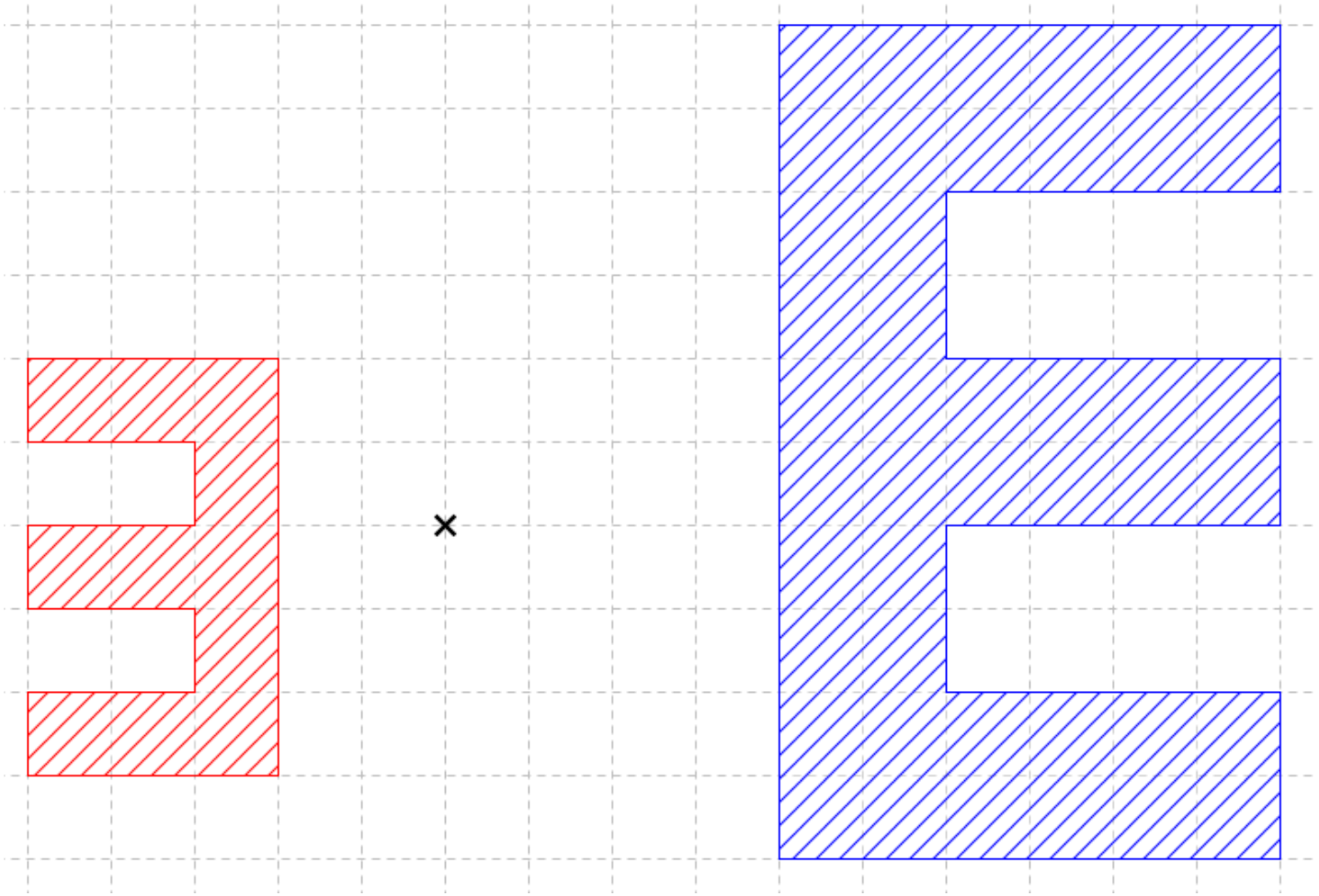


<u>Task:</u> Enlarge the shape shown by scale factor $-\frac{1}{2}$ from the point marked, by following the instructions given below:

1. Find a vector from the point to one corner. *For instance, the vector to the bottom right corner is* $\begin{bmatrix}10\\-4\end{bmatrix}$.
2. Multiply the vector by $-\frac{1}{2}$. *For our example, this would give* $\begin{bmatrix}-5\\2\end{bmatrix}$.
3. Follow the instructions given by the new vector, *from the point of enlargement*. This takes you to the new corner.
4. Repeat as needed for enough corners for you to see the shape being produced, then complete the new shape.

Extension: What is the area of the new shape? What is the area of the original shape? What do you notice?

Enlargement SOLUTIONS



The area of the new shape is $11cm^2$, and the area of the original shape was $44cm^2$.
The new shape, even though the scale factor is $-\frac{1}{2}$, is 4 times smaller in area.

The negative has caused the shape to be inverted – this part is equivalent to a $180°$ rotation,
and the fractional scale factor has shrunk the shape so that all the lengths are $\frac{1}{2}$ of what they were.
This corresponds to an area scale factor of $\frac{1}{4}$.