

Drawing Dilations

COMMON CORE

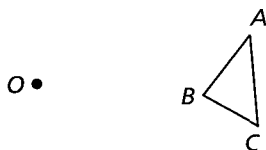
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Essential question: *How do you draw the image of a figure under a dilation?*

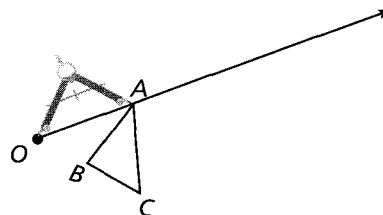
You have already used geometry software to draw the image of a figure under a dilation. The following example shows how to construct the image using a compass and straightedge.

1 EXAMPLE Constructing a Dilation Image

Work directly on the figure below and follow the given steps to construct the image of $\triangle ABC$ after a dilation with center of dilation O and scale factor 3.

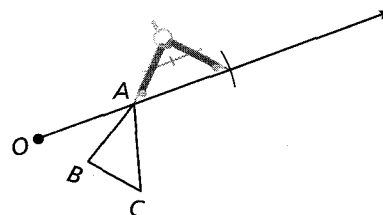


A Use a straightedge to draw \overrightarrow{OA} .

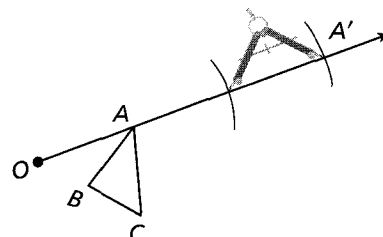


B Place the point of your compass on point O and open the compass to the distance OA .

C Without adjusting the compass, place the point of the compass on point A and make an arc that intersects \overrightarrow{OA} .



D Move the compass to the point of intersection of the arc and the ray \overrightarrow{OA} . Make another arc that intersects \overrightarrow{OA} . Label this point of intersection A' .

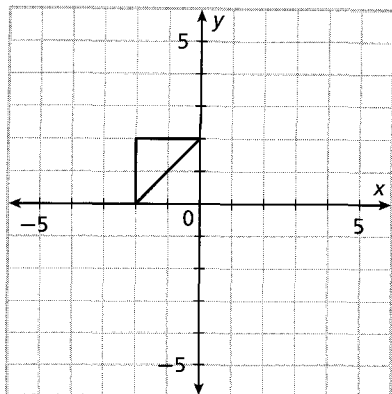


E Repeat the steps for the other vertices of $\triangle ABC$.

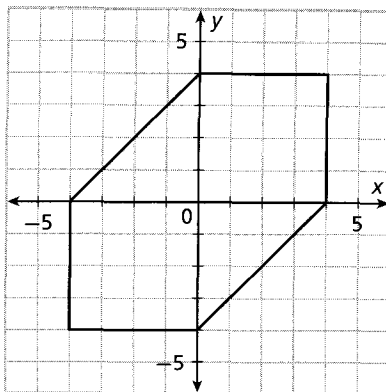
F Once you have located A' , B' , and C' , use a straightedge to draw $\triangle A'B'C'$.

Draw the image of the figure after a dilation with the given scale factor.

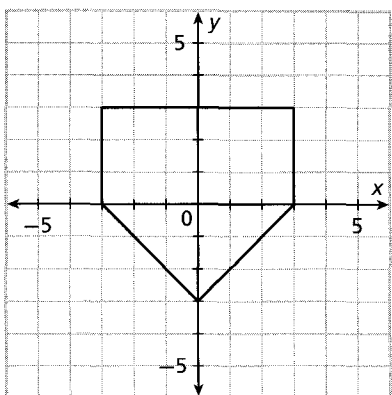
3. scale factor: 2



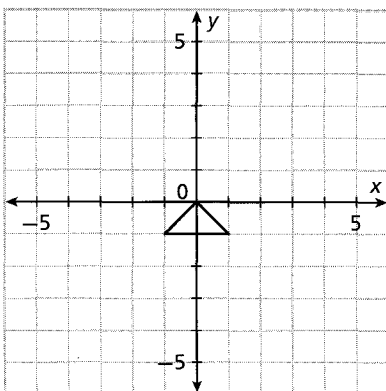
4. scale factor: $\frac{1}{4}$



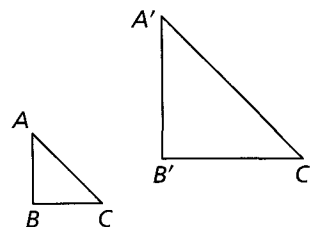
5. scale factor: $\frac{2}{3}$



6. scale factor: 3



7. $\triangle A'B'C'$ is the image of $\triangle ABC$ under a dilation. Explain how you can use a straightedge to find the center of dilation. Then use your method to draw a dot at the center of dilation.



8. Each centimeter on scale drawing of a park represents three meters of actual distance. What is the scale factor of the dilation that maps the park to the scale drawing? _____

9. **Error Analysis** A student claims that a dilation with scale factor m and center of dilation O that is followed by a dilation with scale factor n and center of dilation O is equivalent to a single dilation with scale factor $m + n$ and center of dilation O . Do you agree or disagree? Explain.
