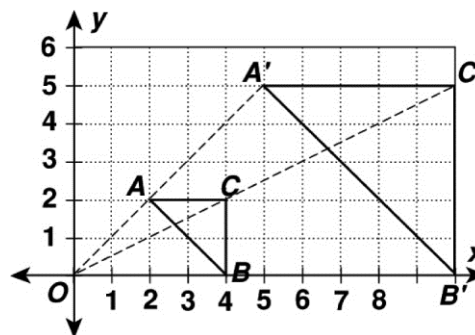# Algebraic Representations of Dilations

You dilate a figure using the origin as the center of dilation. Multiply each coordinate by the scale factor. The scale factor is the number that describes the change in size in a dilation.

Using the origin O as the center of dilation, dilate $\triangle ABC$ by a scale factor of 2.5.

$A(2, 2) \rightarrow A'(2.5 \bullet 2, 2.5 \bullet 2)$ or $A'(5, 5)$

$B(4, 0) \rightarrow B'(2.5 \bullet 4, 2.5 \bullet 0)$ or $B'(10, 0)$

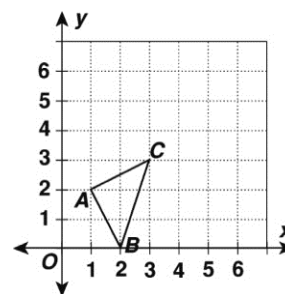$C(4, 2) \rightarrow C'(2.5 \bullet 4, 2.5 \bullet 2)$ or $C'(10, 5)$

Using the origin as the center of dilation, dilate $\triangle ABC$ by a scale factor of 2. Graph the dilation.

1. $A(1, 2) \rightarrow A'(2 \bullet 1, 2 \bullet 2)$ or $A'(\underline{\quad}, \underline{\quad})$

   $B(2, 0) \rightarrow B'(\underline{\quad} \bullet 2, \underline{\quad} \bullet 0)$ or $B'(\underline{\quad}, \underline{\quad})$

   $C(3, 3) \rightarrow C'(\underline{\quad} \bullet 3, \underline{\quad} \bullet 3)$ or $C'(\underline{\quad}, \underline{\quad})$

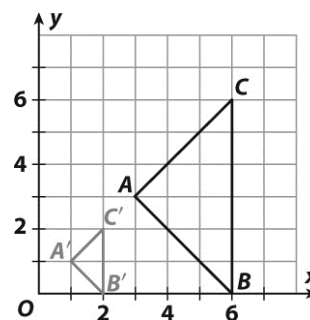When the scale factor is a fraction between 0 and 1, the image is smaller than the original figure.
Using the origin O as the center of dilation, dilate $\triangle ABC$ by a scale factor of $\dfrac{1}{3}$.

$A(3, 3) \rightarrow A'\left(\dfrac{1}{3} \bullet 3, \dfrac{1}{3} \bullet 3\right)$ or $A'(1, 1)$

$B(6, 0) \rightarrow B'\left(\dfrac{1}{3} \bullet 6, \dfrac{1}{3} \bullet 0\right)$ or $B'(2, 0)$

$C(6, 6) \rightarrow C'\left(\dfrac{1}{3} \bullet 6, \dfrac{1}{3} \bullet 6\right)$ or $C'(2, 2)$
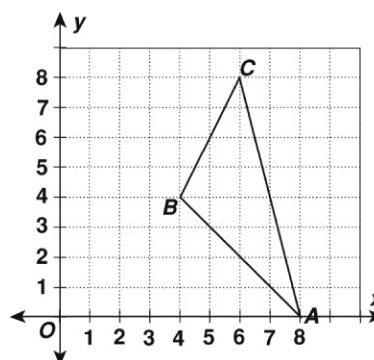
Using the origin as the center of dilation, dilate $\triangle ABC$ by a scale factor of $\dfrac{1}{2}$. Graph the dilation.

2. $A(8, 0) \rightarrow A'\left(\dfrac{1}{2} \bullet 8, \dfrac{1}{2} \bullet 0\right)$ or $A'(\underline{\quad}, \underline{\quad})$

   $B(4, 4) \rightarrow B'(\underline{\quad} \bullet 4, \underline{\quad} \bullet 4)$ or $B'(\underline{\quad}, \underline{\quad})$
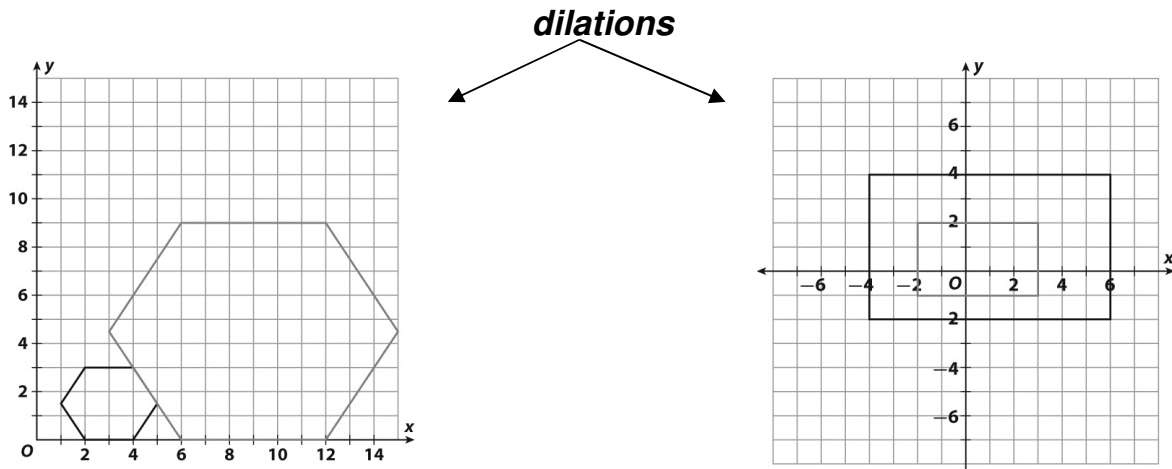
   $C(6, 8) \rightarrow C'(\underline{\quad} \bullet 6, \underline{\quad} \bullet 8)$ or $C'(\underline{\quad}, \underline{\quad})$

Algebraic Representations of Dilations

Reading Strategies: Build Vocabulary

A **dilation** changes the size of a figure without changing its shape.
Some dilations are **enlargements**. Some dilations are **reductions**.

dilations

The gray figure is an **enlargement**.   The gray figure is a **reduction**.

The gray figures are called **images** of the black figure.

The black figures are the original figures.

Sometimes the original figures are called **preimages**.

Vertices of original figures or preimages are
indicated with italic capital letters. For example,
ABC.

Vertices of dilated figures or images are indicated
with italic capital letters followed by a small mark
called a prime symbol. For example, *A'B'C'*.
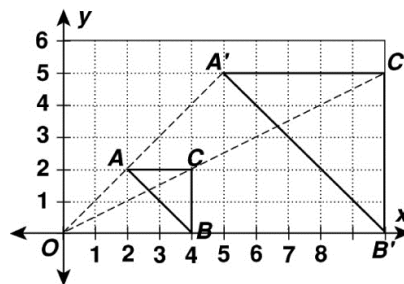
Complete.

1. The figures at the right show a
   reduction. Label the vertices of
   the original figure *MNP*. Label
   the vertices of the dilation
   M'N'P'.

2. Explain the difference between
   an enlargement and a reduction.

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