

Algebraic Representations of Dilations

Success for English Learners

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

Problem 1

What are the characteristics of an enlargement?

Look at the coordinates of corresponding vertices.

$$A(0, -2) \rightarrow A'(0, -4)$$

$$B(4, 4) \rightarrow B'(8, 8)$$

$$C(4, -2) \rightarrow C'(8, -4)$$

Find the ratios of corresponding lengths.

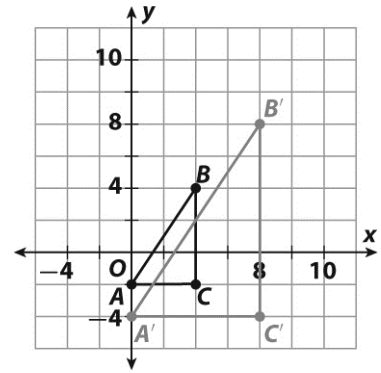
$$\frac{A'C'}{AC} = \frac{8}{4} = 2$$

$$\frac{B'C'}{BC} = \frac{12}{6} = 2$$

The ratios are equal and are greater than

$A'B'C'$ is an **enlargement** of ABC .

- $A'B'C'$ is the same shape as ABC , but larger.
- the ratio of corresponding lengths is greater than 1

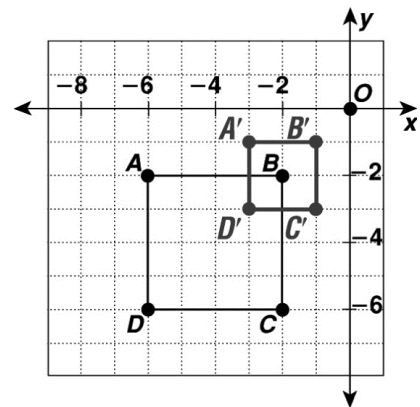


Problem 2

What are the characteristics of a reduction?

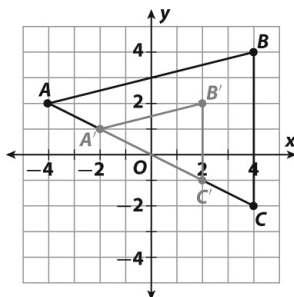
$A'B'C'D'$ is a **reduction** of $ABCD$.

- $A'B'C'D'$ is the same shape as $ABCD$, but smaller.
- the ratio of corresponding lengths is less than 1

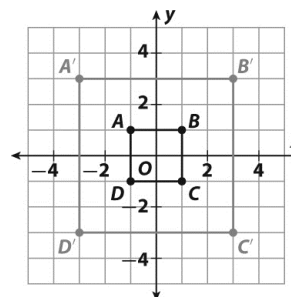


Tell whether each dilation is an enlargement or a reduction.

1. _____



2. _____



Algebraic Representations of Dilations

Practice and Problem Solving: A/B

Use triangle ABC for Exercises 1–4.

1. Give the coordinates of each vertex of $\triangle ABC$.

A _____ B _____ C _____

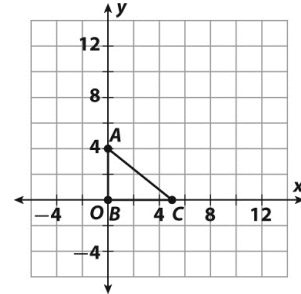
2. Multiply each coordinate of the vertices of $\triangle ABC$ by 2 to find the vertices of the dilated image $\triangle A'B'C'$.

A' _____ B' _____ C' _____

3. Graph $\triangle A'B'C'$.

4. Complete this algebraic rule to describe the dilation.

$(x, y) \rightarrow$ _____



Use the figures at the right for Exercises 5–7.

5. Give the coordinates of each vertex of figure $JKLMN$.

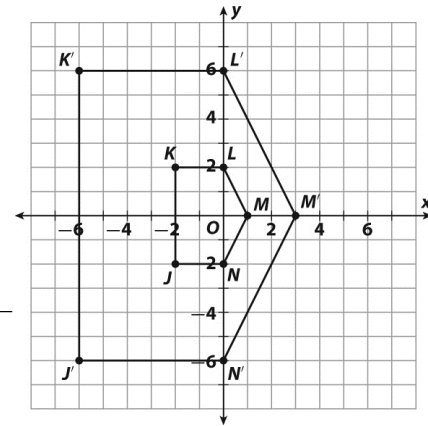
J _____ K _____ L _____

M _____, N _____

6. Give the coordinates of each vertex of figure $J'K'L'M'N'$.

J' _____ K' _____ L' _____

M' _____, N' _____



7. Complete this algebraic rule to describe the dilation.

$(x, y) \rightarrow$ _____

Li made a scale drawing of a room. The scale used was 5 cm = 1 m.

The scale drawing is the preimage and the room is the dilated image.

8. What is the scale in terms of centimeters to centimeters?

9. Complete this algebraic rule to describe the dilation from the scale drawing to the room.

$(x, y) \rightarrow$ _____

10. The scale drawing measures 15 centimeters by 20 centimeters. What are the dimensions of the room?
