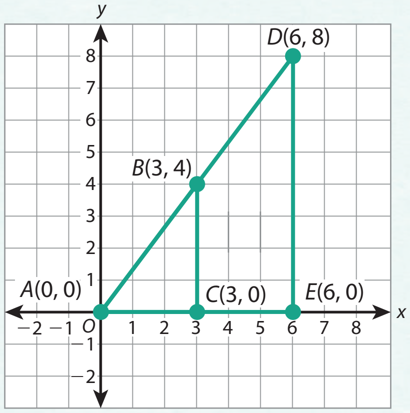
Dear Family,

Your child is learning about transformations and similarity.

A *dilation* is a transformation that changes the size of a figure by enlarging or shrinking it.

A dilation enlarges or shrinks a figure according to a scale factor. The center of the dilation, usually the origin, is a point that remains unchanged by the dilation. Dilated figures are *similar* to their original figures, which means the corresponding side lengths are proportional.

In the figure, $\triangle ABC$ is dilated to form $\triangle ADE$, which means that $\triangle ABC$ is similar to $\triangle ADE$.



You can find the scale factor by finding the ratio of corresponding side lengths.

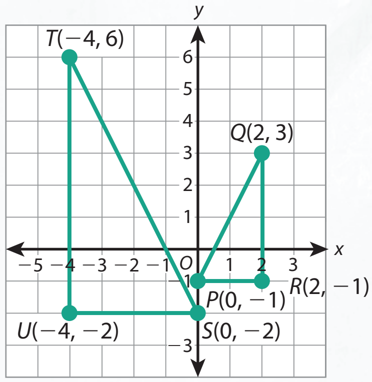
$\frac{AE}{AC} = \frac{6}{3}$ and $\frac{DE}{BC} = \frac{8}{4}$

Each ratio is equal to 2, so the scale factor is 2.

$\triangle ABC$ is dilated by a factor of 2 with the center of the dilation at the origin to form $\triangle ADE$.

Consider the following problem:

In the diagram, $\triangle PQR$ is similar to $\triangle STU$. Describe the sequence of transformations that transform $\triangle PQR$ to $\triangle STU$.



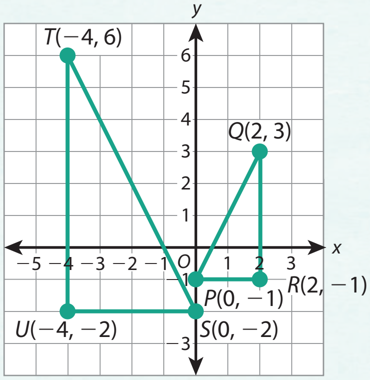
On the next page you will see how your child can use the given information and the graph to describe the transformations.

NEXT

Transformations and Similarity: Sample Solution

Describe the sequence of transformations that map $\triangle PQR$ to $\triangle STU$.

Use the graph to describe the changes in coordinates of the vertices of the triangles.



- $P(0, -1)$ is transformed to $S(0, -2)$.
- $Q(2, 3)$ is transformed to $T(-4, 6)$.
- $R(2, -1)$ is transformed to $U(-4, -2)$.
- The *x*-coordinate of each vertex of $\triangle STU$ has the opposite sign of the *x*-coordinate of each vertex of $\triangle PQR$.
- The coordinates of each vertex of $\triangle PQR$ are multiplied by 2 or −2 to produce the coordinates of each vertex of $\triangle STU$.

Use what you just discovered about the coordinates to describe the transformations.

- $\triangle PQR$ was reflected or flipped over the *y*-axis. This accounts for the opposite signs in the *x*-coordinates.
- $\triangle PQR$ was dilated about the origin, (0, 0). You can use one pair of corresponding side lengths to find the scale factor: $\frac{TU}{QR} = \frac{8}{4} = 2$. This accounts for the doubling of the coordinates.

Answer: $\triangle PQR$ could have been reflected over the *y*-axis and then dilated with the center of the dilation at the origin and a scale factor of 2 to produce $\triangle STU$, or $\triangle PQR$ could have been dilated first and then reflected.

Vocabulary

dilation transformation in which an original figure and its image are similar.

scale factor the ratio of a pair of corresponding sides of similar figures produced by a dilation.

center the point that is transformed to itself by a dilation.