8.7 Dilations

A dilation is a nonrigid transformation that reduces or enlarges. The image and preimage are similar but not congruent.

The scale factor \((k)\) is a positive number such that:
- If \(0 < k < 1\), the dilation is a reduction.
- If \(k > 1\), the dilation is an enlargement.

To determine the scale factor if it is not given, divide a segment from the image by a segment from the preimage.

Example: Find the scale factor of each dilation.

1. \(\frac{6}{14} \rightarrow \frac{3}{7}\)
2. \(\frac{9}{6} \rightarrow \frac{3}{2}\)
Example: Find the coordinates of the vertices of each figure after the given transformation and graph.

Dilation of $\frac{5}{2}$
A(-4,-2), B(0,3), C(2,-1)

A'($\frac{5}{2} \cdot -4, \frac{5}{2} \cdot -2$) → (-10,-5)
B'($\frac{5}{2} \cdot 0, \frac{5}{2} \cdot 3$) → (0, $\frac{15}{2}$)
C'($\frac{5}{2} \cdot 2, \frac{5}{2} \cdot -1$) → (5, $\frac{5}{2}$)

Example: Find the coordinates of the vertices of each figure after the given transformation and graph.

Dilation of $\frac{1}{2}$
A(8,6), B(-4,10), C(0,-7)

A'($\frac{1}{2} \cdot 8, \frac{1}{2} \cdot 6$) → (4,3)
B'($\frac{1}{2} \cdot -4, \frac{1}{2} \cdot 10$) → (-2,5)
C'($\frac{1}{2} \cdot 0, \frac{1}{2} \cdot -7$) → (0,-3.5)