[model student]

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10.x Geometry

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Examples of Dilations on the Coordinate Plane

This paper demonstrates several examples of polygons and their images after dilation. The objects are shown on the coordinate plane and drawn with dynamic geometry software (the Geogebra Graphing Calculator).

The dilation of a triangle with the center of dilation the origin

Figure 1 shows $\triangle ABC \longrightarrow \triangle A'B'C'$ with a dilation scale factor $k = 1.5$ centered at the origin. The triangles are in standard position (one vertex on the origin and one side on the *x*-axis).

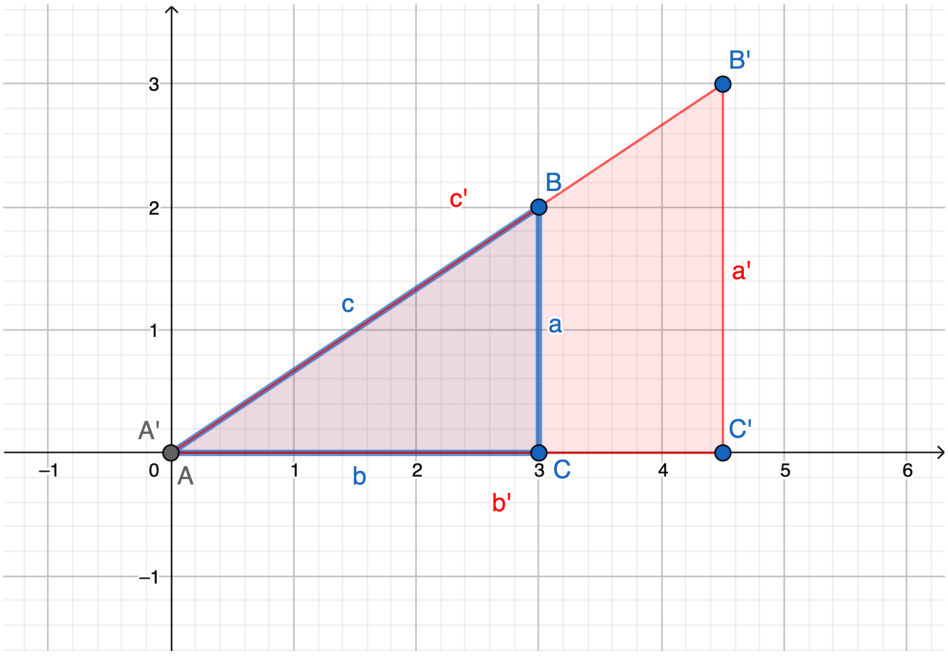

Figure 1: Dilation centered at the origin

The dilation of a polygon with a fractional scale factor centered inside the object

Figure 2, below, shows pentagon $ABCDE \longrightarrow A'B'C'D'E'$ under a dilation. The scale factor $k = 0.5$ is less than one, so the polygon is reduced in size. The center of the dilation is the point $P(1,2)$, marked with a cross.

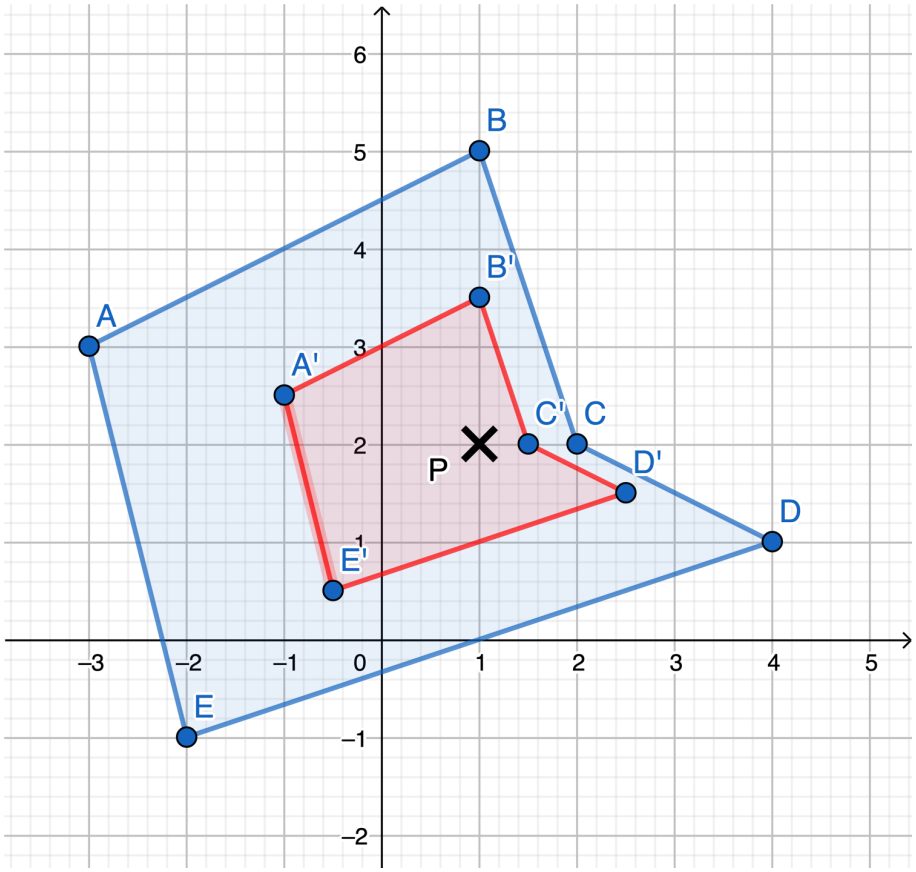

Figure 2: Dilation of a pentagon with a fractional scale factor

The dilation of a line, showing the mapping of the *y*-intercept

When a line is dilated the slope does not change, but the *y*-intercept may move. Figure 3 on the next page shows a dilation centered at the origin O mapping line $f \longrightarrow f'$. The equations

of the two lines are, for the preimage, $y = -\frac{1}{2}x + 2$ and its image, $y = -\frac{1}{2}x + 5$. Note that the two lines are parallel. Their slopes are equal.

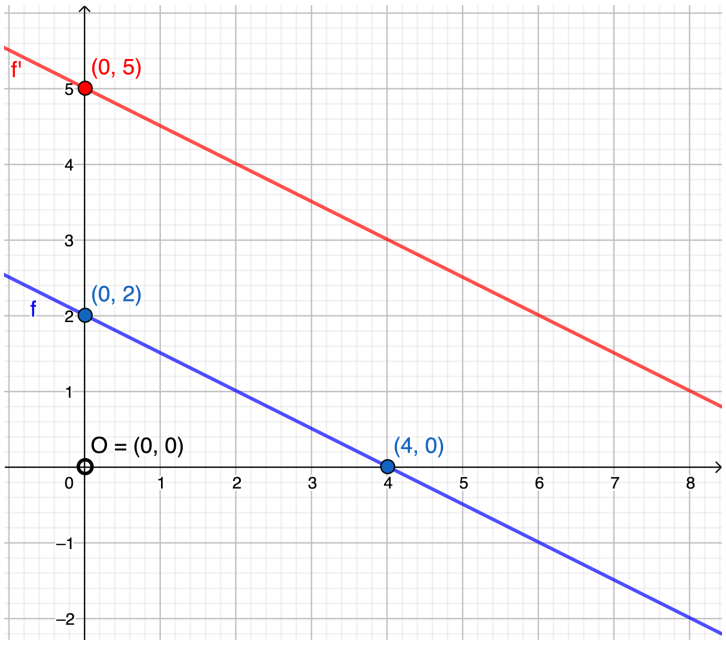

Figure 3: Dilation of a line