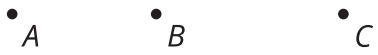
Unit 2, Lesson 4

Dilations on a Square Grid

Let's dilate figures on a square grid.

4.1 Estimating a Scale Factor

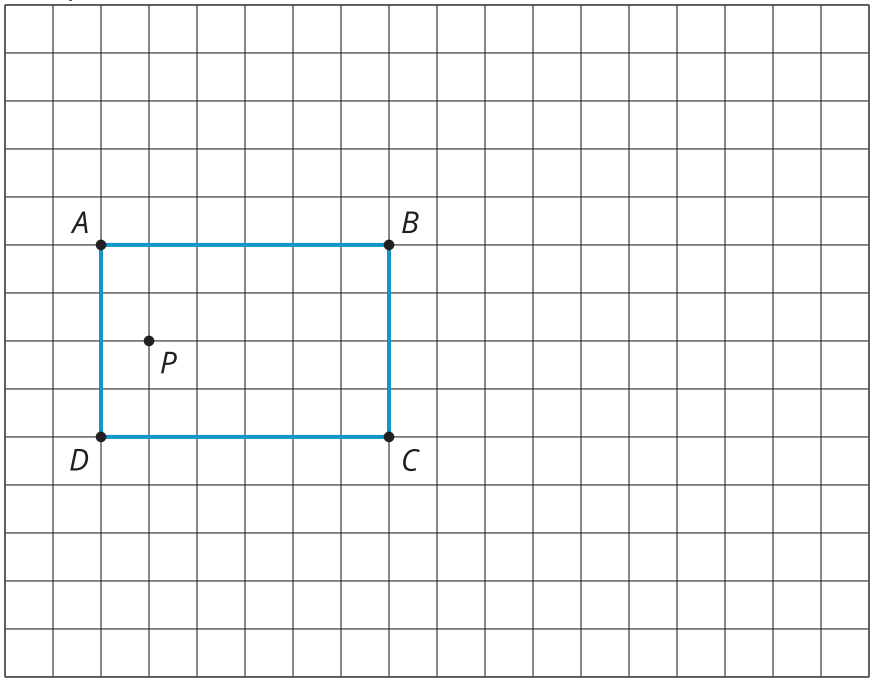
Point C is the dilation of point B with center of dilation A and scale factor s.



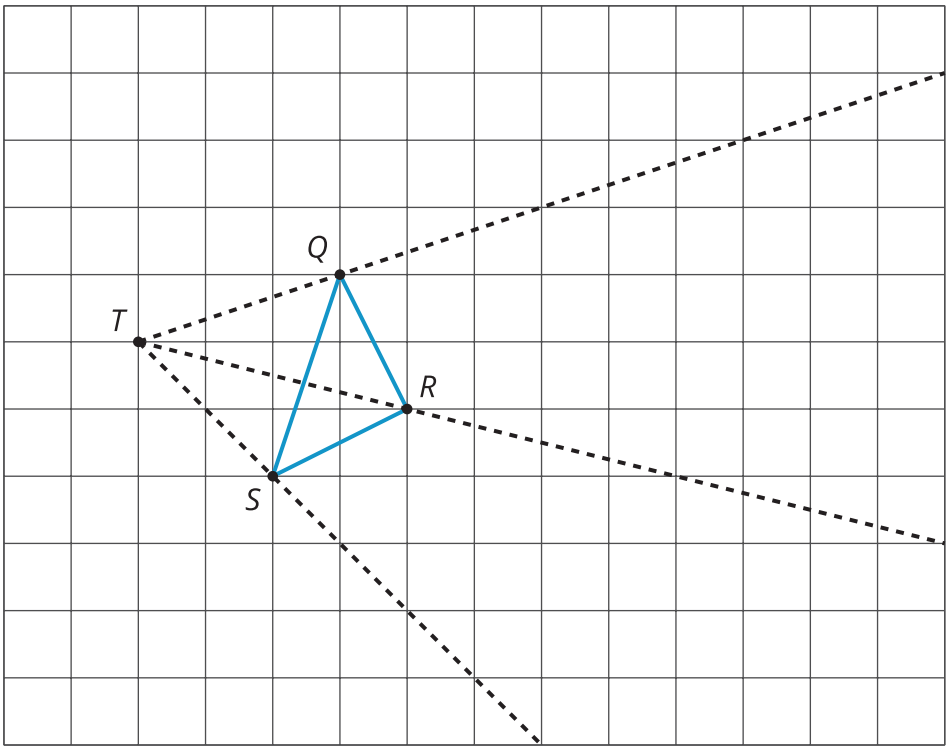
Estimate s. Be prepared to explain your reasoning.

4.2 Dilations on a Grid

1. Draw the image of quadrilateral $ABCD$ after a dilation with center P and scale factor 2.



2. Draw the image of triangle QRS after a dilation with center T and scale factor 2.
3. Draw the image of triangle QRS after a dilation with center T and scale factor $\frac{1}{2}$.



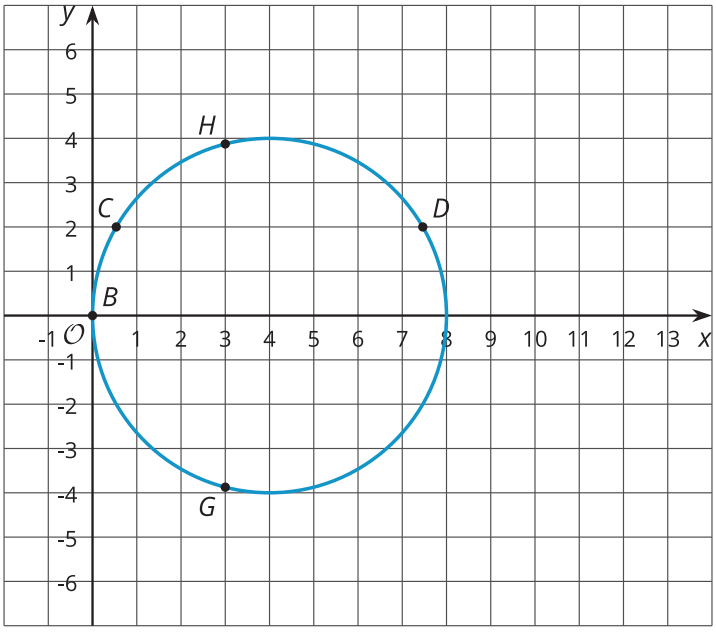
4.3 Card Sort: Matching Dilations on a Coordinate Plane

Your teacher will give you a set of cards containing descriptions of dilations and graphs. Match each number card showing a figure in the coordinate plane with a letter card describing the image after the given dilation. Record your matches and be prepared to explain your reasoning.

One of the number cards will not have a match. For this card, you will need to draw an image.

Are you ready for more?

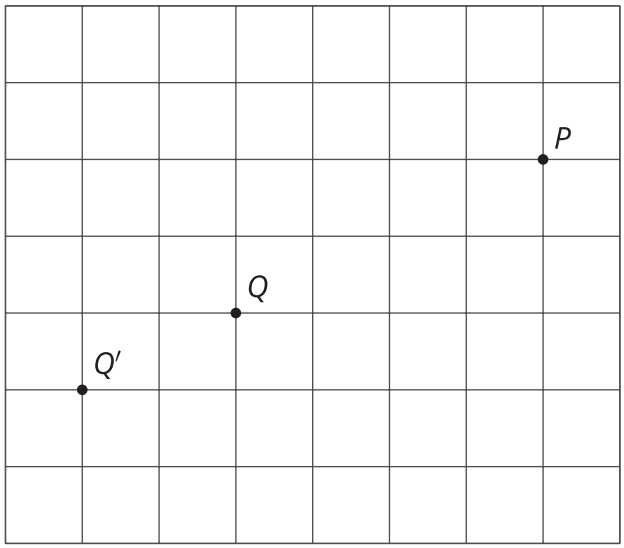
The image of a circle under dilation is a circle when the center of the dilation is the center of the circle. What happens if the center of dilation is a point on the circle? Using center of dilation $(0, 0)$ and scale factor 1.5, dilate the circle shown on the diagram. This diagram shows some points to try dilating.



Lesson 4 Summary

Square grids can be useful for showing dilations, especially when the center of dilation and the point(s) being dilated lie at grid points. Rather than using a ruler to measure the distance between the points, we can count grid units.

For example, the dilation of point Q with center of dilation P and scale factor $\frac{3}{2}$ will be 6 grid squares to the left and 3 grid squares down from P, since Q is 4 grid squares to the left and 2 grid squares down from P. The dilated image is marked as Q'.



Sometimes the square grid comes with coordinates, giving us a convenient way to name points. Sometimes the coordinates of the image can be found just using arithmetic, without having to measure.

For example, to perform a dilation with center of dilation at $(0, 0)$ and scale factor 2 on the triangle with coordinates $(-1, -2)$, $(3, 1)$, and $(2, -1)$, we can just double the coordinates to get $(-2, -4)$, $(6, 2)$, and $(4, -2)$.