Dilations on a Square Grid

Lesson 4

CCSS Standards: Addressing	• 8.G.A • 8.G.A.3

Let's Dilate Figures on a Rectangular Grid!

Estimating a Scale Factor

Warm Up 4.1

Estimate the scale factor for a dilation.

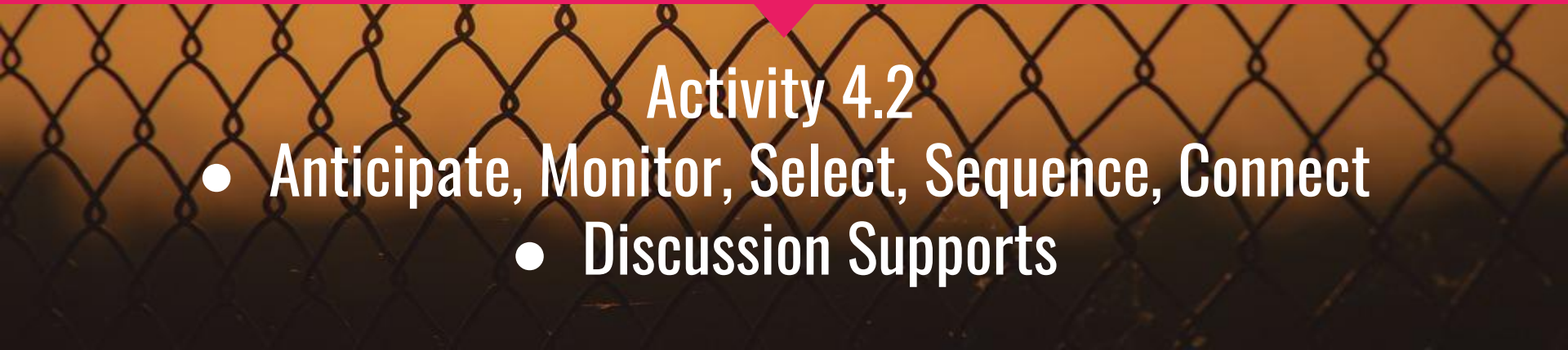
Estimate doesn't mean guess!

Use the math tools that you have available to you!

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.

Is the scale factor greater than **1**?
Is the scale factor greater than **2**?
Is the scale factor greater than **3**?
Is the scale factor **greater or less than 2.5**? How do you know?

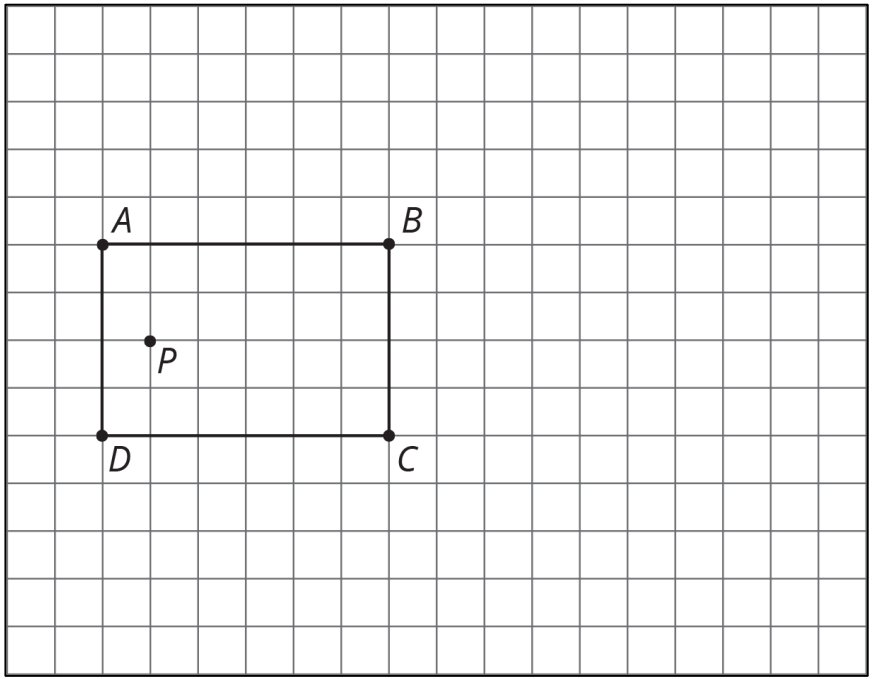
Dilations on a Grid

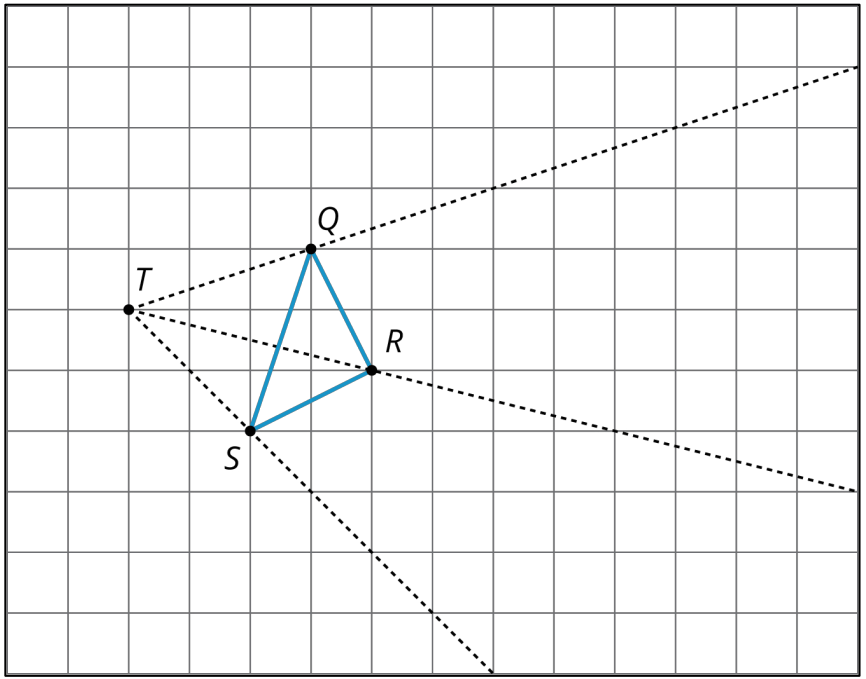


Activity 4.2

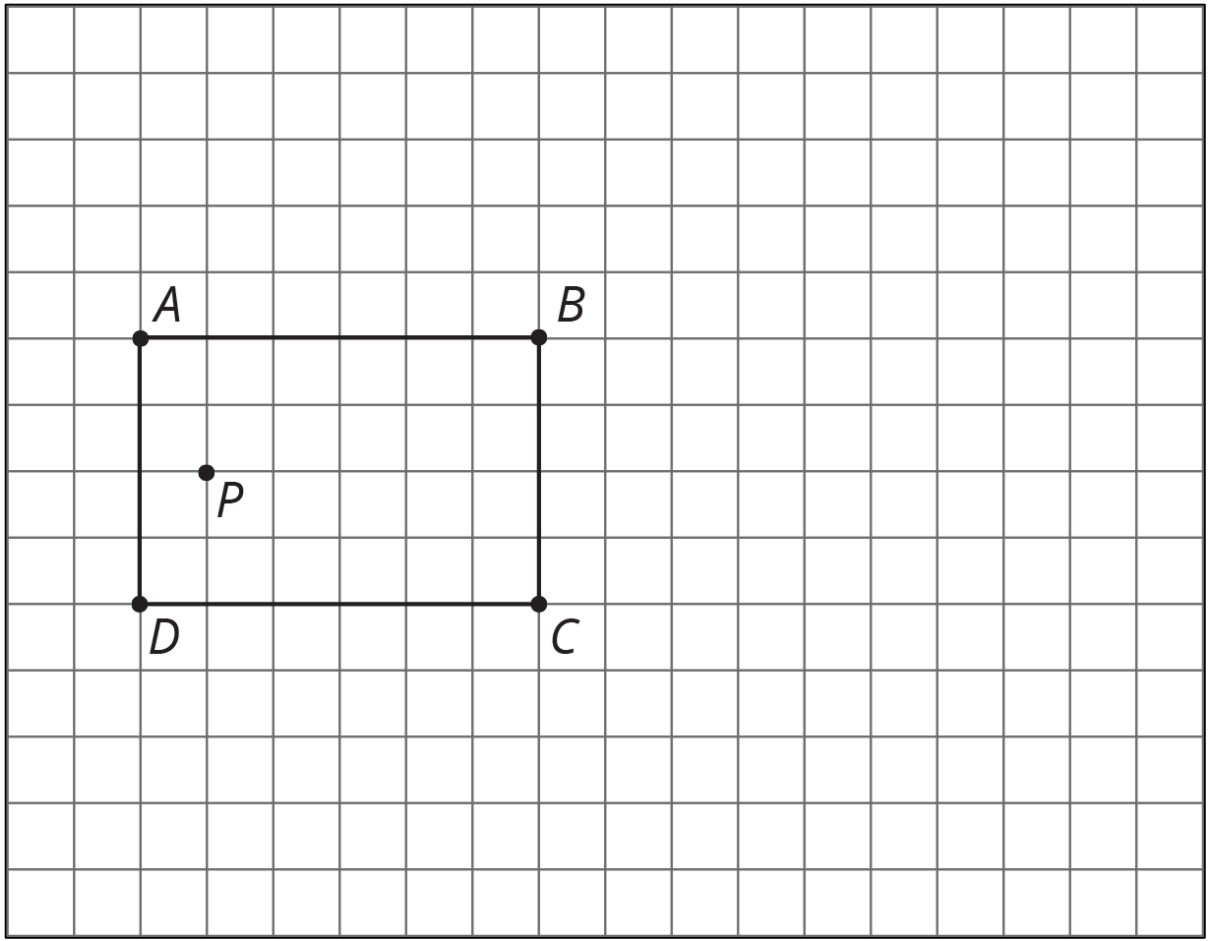
- Anticipate, Monitor, Select, Sequence, Connect
- Discussion Supports

Please begin working on this task using Quiet Work Time.





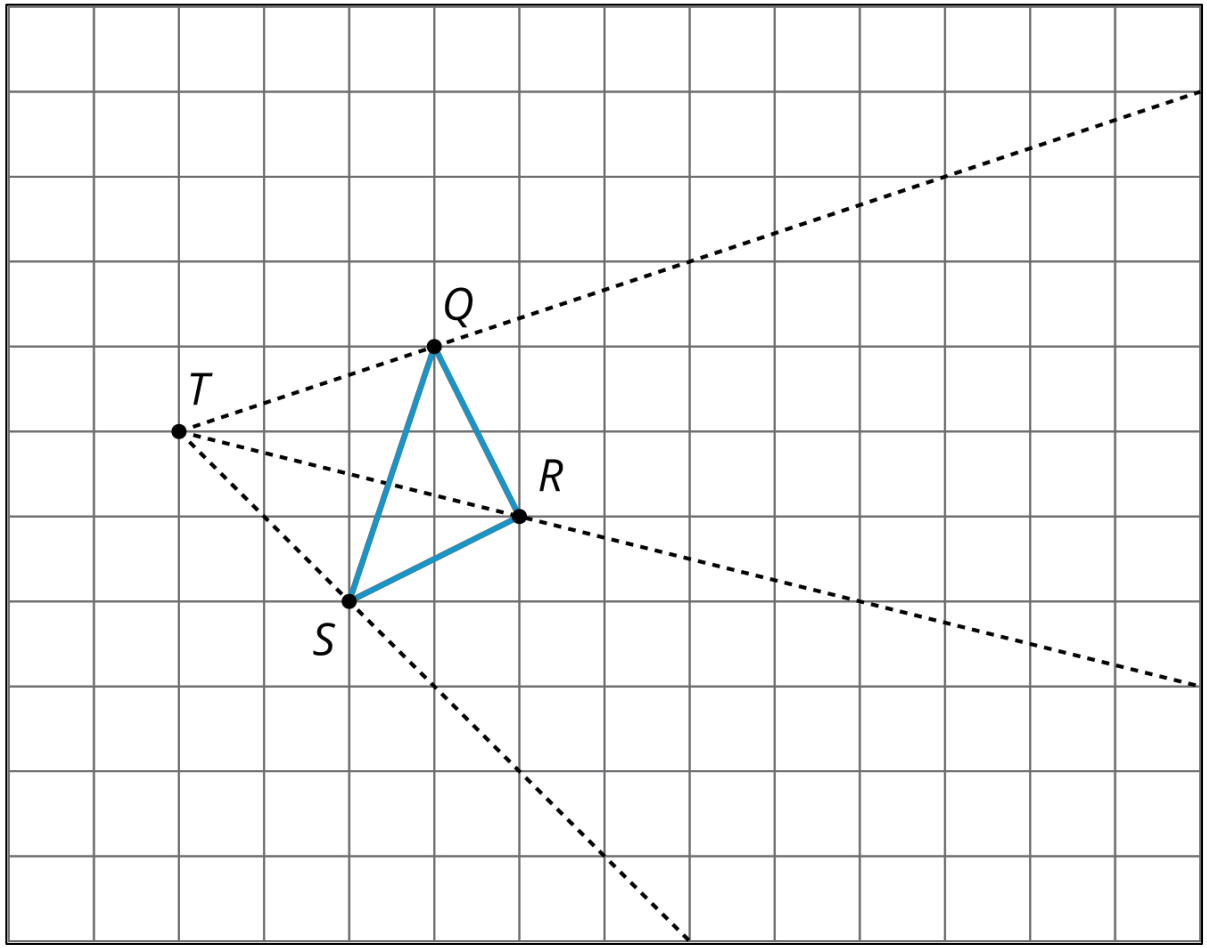
How did you find the dilation?



How did you find the dilation?

Now, let's work with a grid and its coordinates!

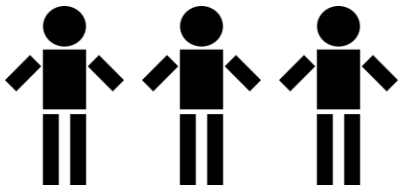
The coordinates give a concise way to *name* points.



Card Sort: Matching Dilations on a Coordinate Grid

Activity 4.3

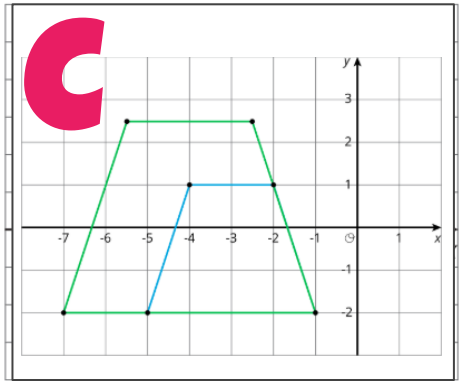
- Compare and Connect



- Your teacher will give you some cards. Each of Cards 1–6 shows a figure in the coordinate plane and describes a dilation.
- Each of Cards A–E describes the image of the dilation for one of the numbered cards.
- ★ Match number cards with letter cards. One of the number cards will not have a match. For this card, you'll need to draw an image.

1.

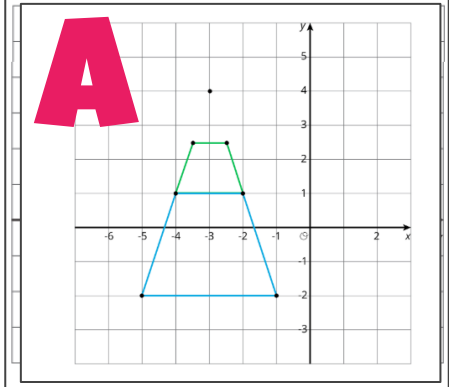
C



Dilate the trapezoid using center (-1, -2) and scale factor $\frac{3}{2}$

2.

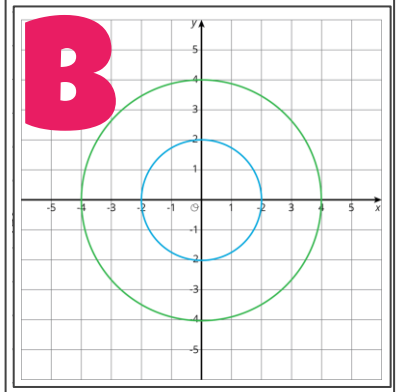
A



Dilate the trapezoid using center (-3, 4) and scale factor $\frac{1}{2}$.

3.

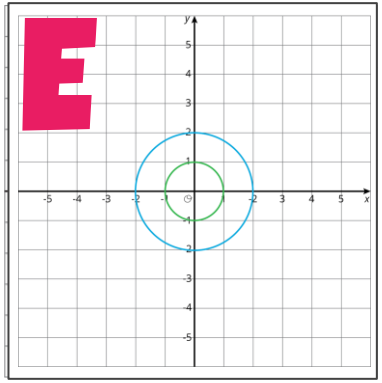
B



Dilate the circle using center (0, 0) and scale factor 2.

4.

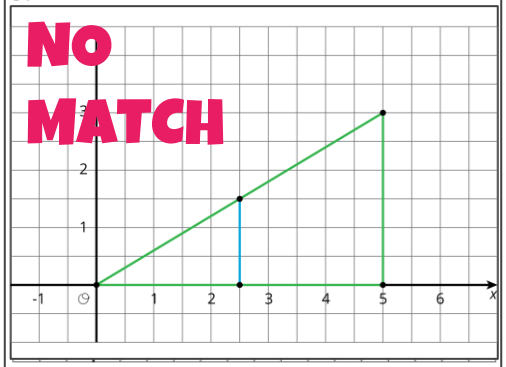
E



Dilate the circle using center (0,0) and scale factor $\frac{1}{2}$.

5.

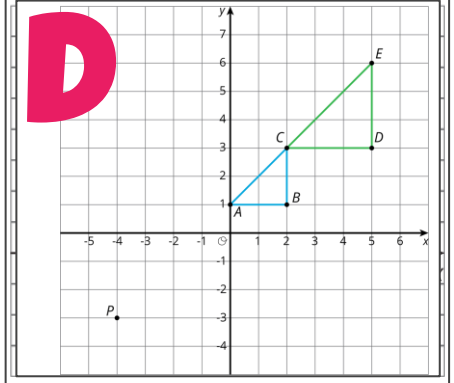
NO MATCH



Dilate the triangle using center (0, 0) and scale factor 2.

6.

D



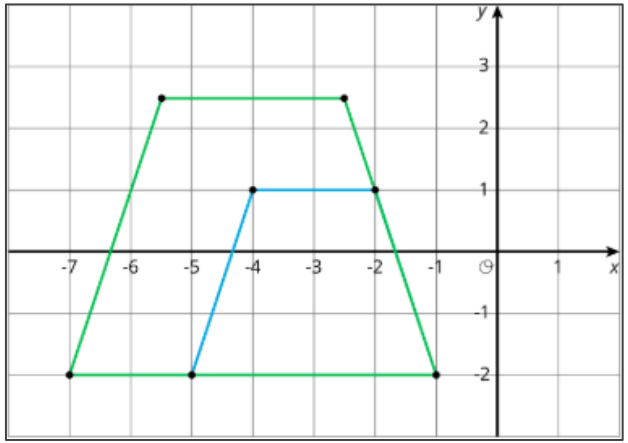
Dilate the triangle using center (-4, -3) and scale factor 1.5.

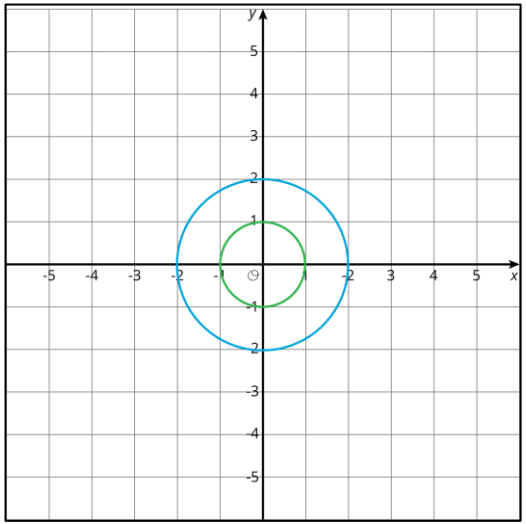
BIG IDEAS

A dilation maps a circle to a circle, a quadrilateral to a quadrilateral, and a triangle to a triangle.

If the **center of dilation** is one of the vertices, then that vertex is on the dilated polygon.

(Which image shows an example of this idea?)

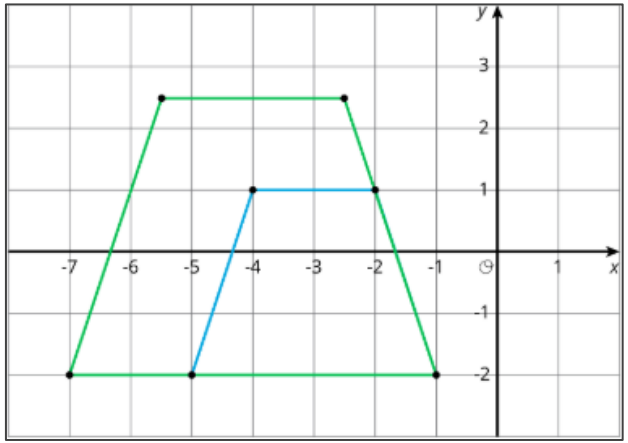


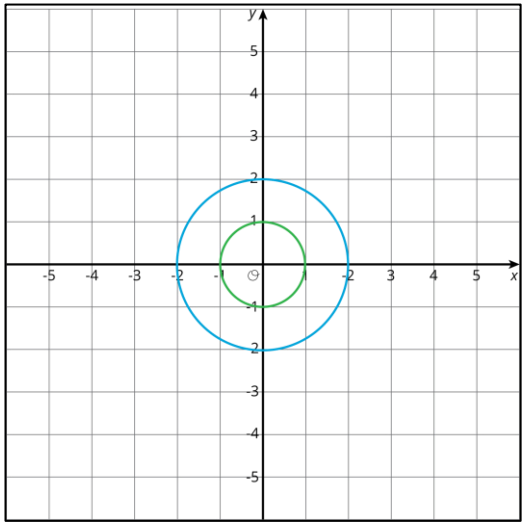


BIG IDEAS

If the scale factor is less than 1 then the dilated image is **smaller** _____ than the original figure.

If the scale factor is greater than 1 then the dilated image is **larger** _____ than the original figure.

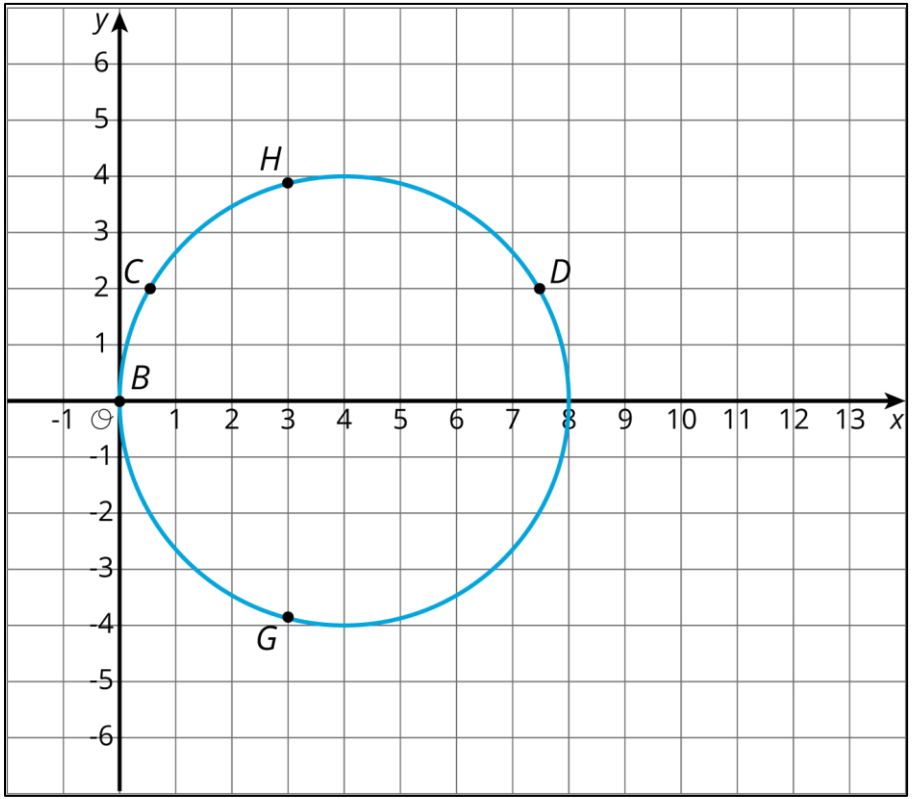




“Are you ready for more?”

The image of a circle under dilation is a circle when the center of dilation is the center of the circle. What happens if the center of dilation is a point on the circle?

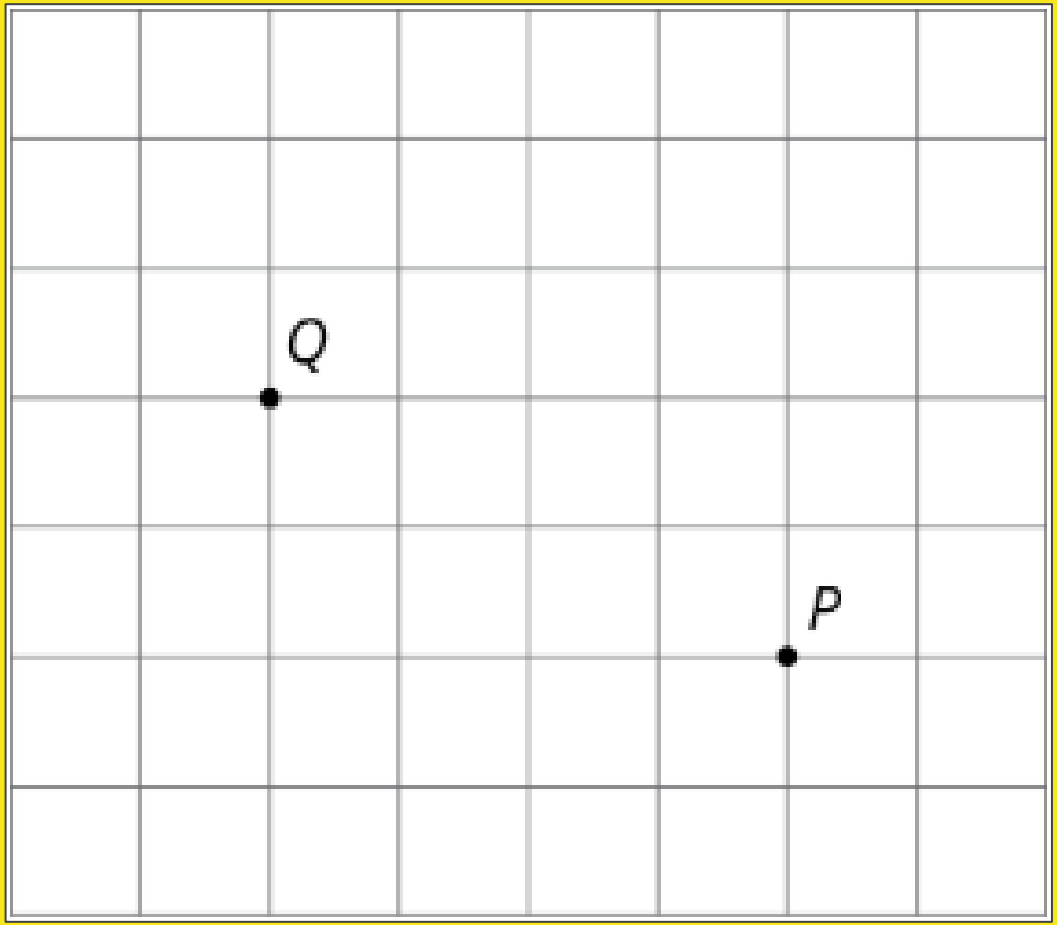
Using center of dilation (0,0) and scale factor 1.5, dilate the circle shown on the diagram. This diagram shows some points to try dilating.



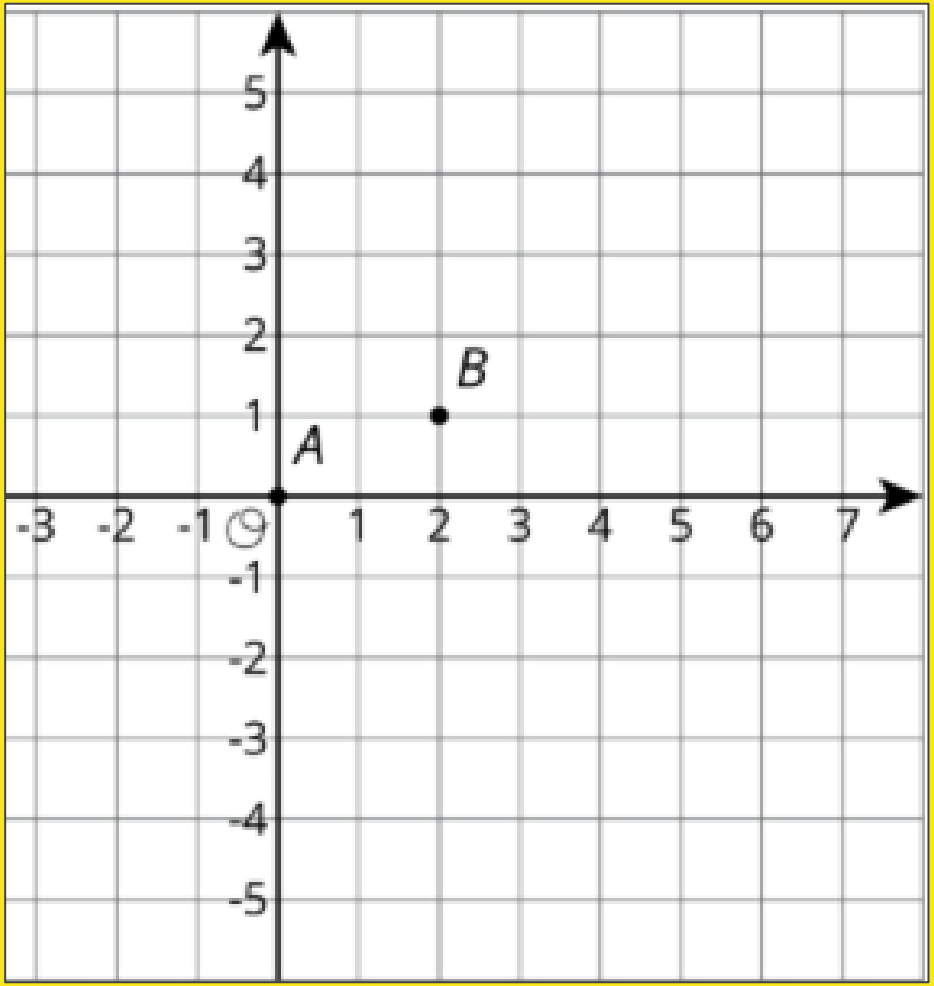
How are dilations performed on a square grid?

How do coordinates help describe and perform dilations?

How can you dilate Q with center P and scale factor ½?



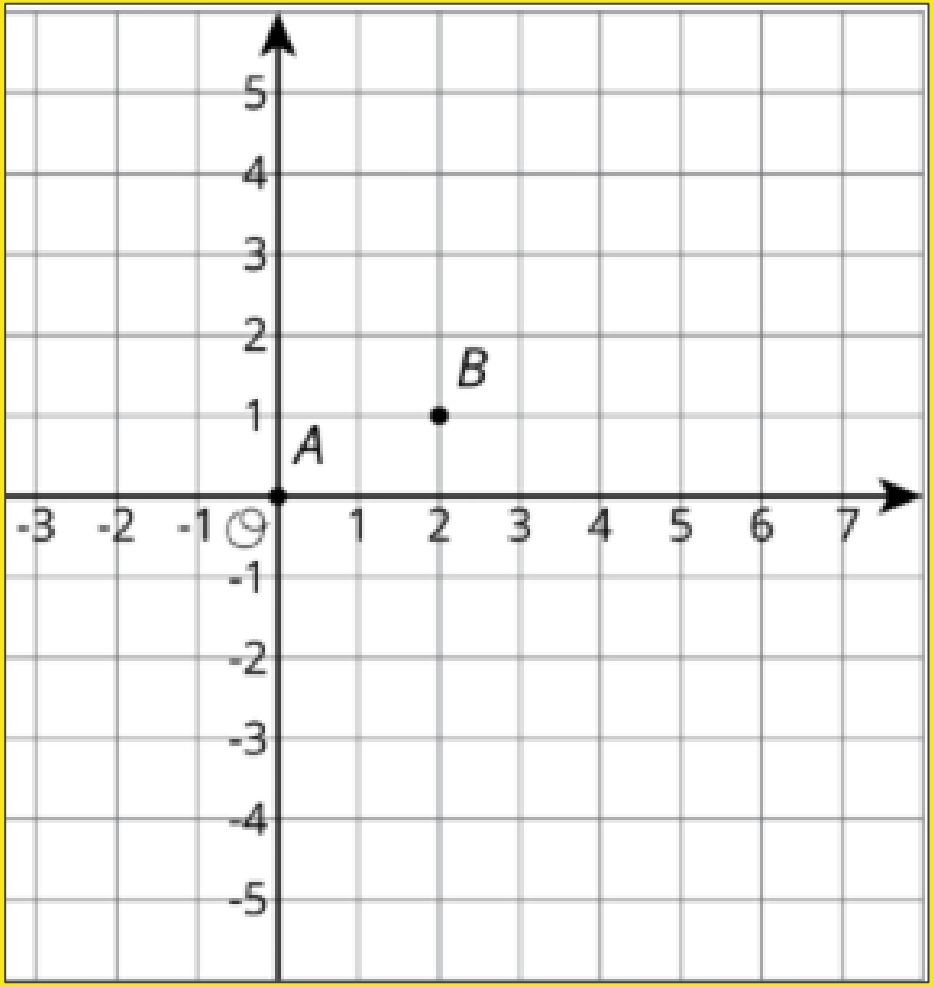
When the grid has coordinates, it's easier to communicate the location of new points!



In the figure,
A = (0,0) and B = (2,1).

What is the dilation of *B* with center *A* and scale factor 3?

We can simply say (6,3) to communicate the answer!



Today's Goals

- I can apply dilations to figures on a rectangular grid.
- If I know the angle measures and side lengths of a polygon, I know the angle measures of the polygon if I apply a dilation with a certain scale factor.

A Dilated Image

Cool Down 4.4