Dilations with No Grid

Lesson 3

CCSS Standards: Addressing	• 8.G.A

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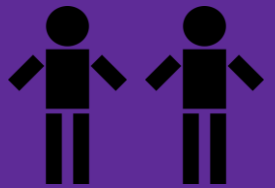
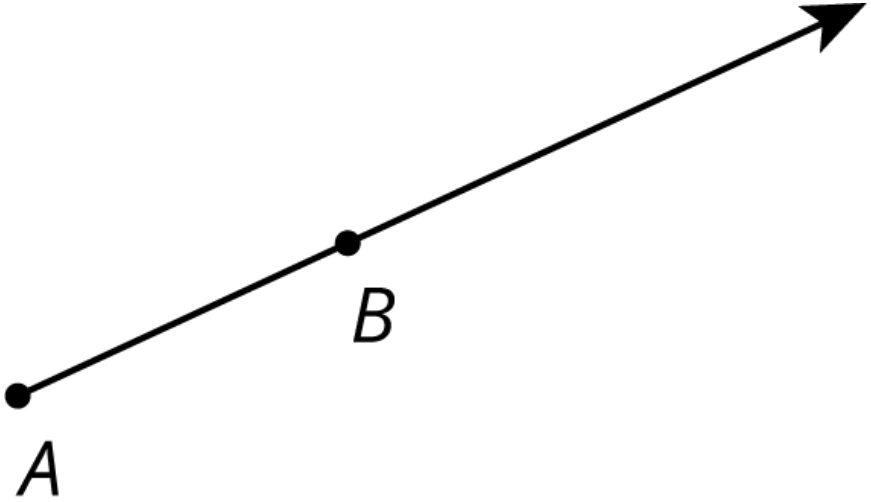
Let's dilate figures not on grids!

Points on a Ray

Warm Up 3.1



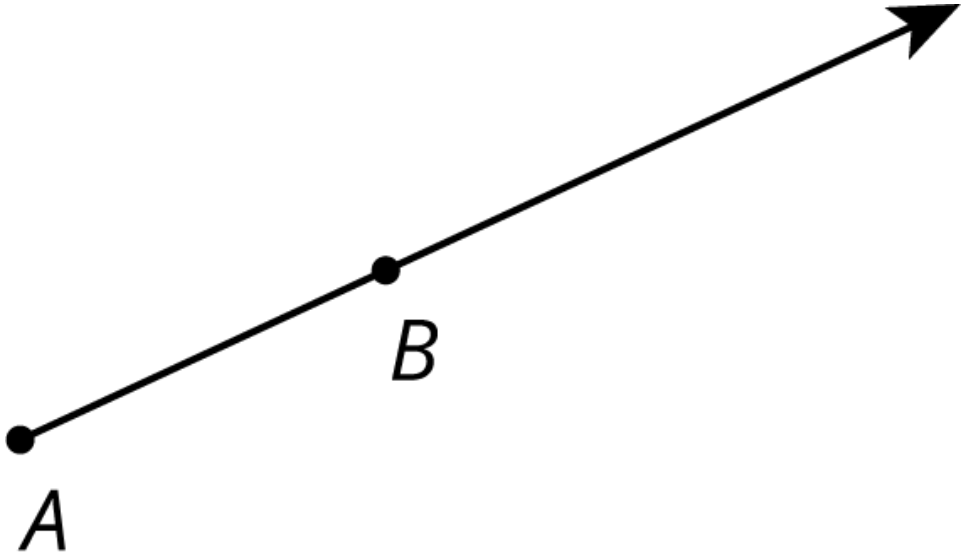


Please begin working on your Warm-Up.

Use available math tools as needed!

1. Find and label a point C on the ray whose distance from A is twice the distance from B to A.
2. Find and label a point D on the ray whose distance from A is half the distance from B to A.

How is this similar to working with a circular grid? How is it different?



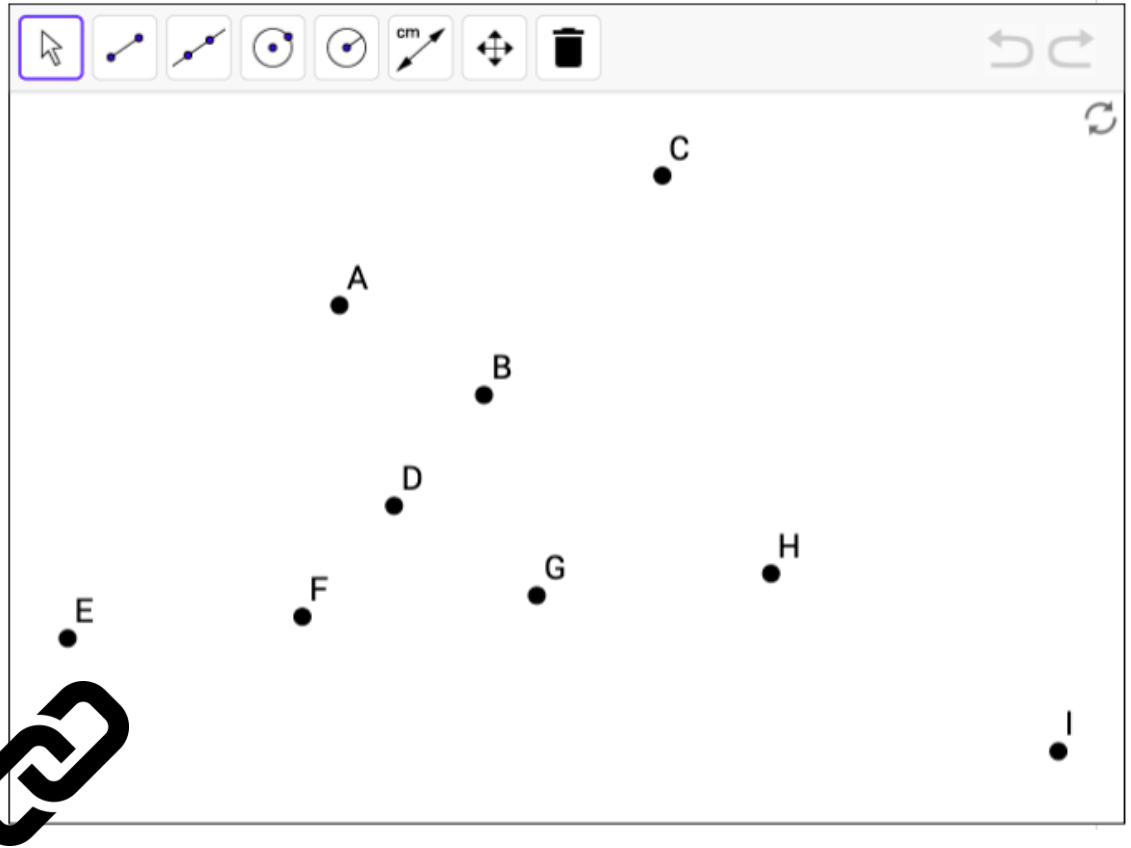
Dilation Obstacle Course

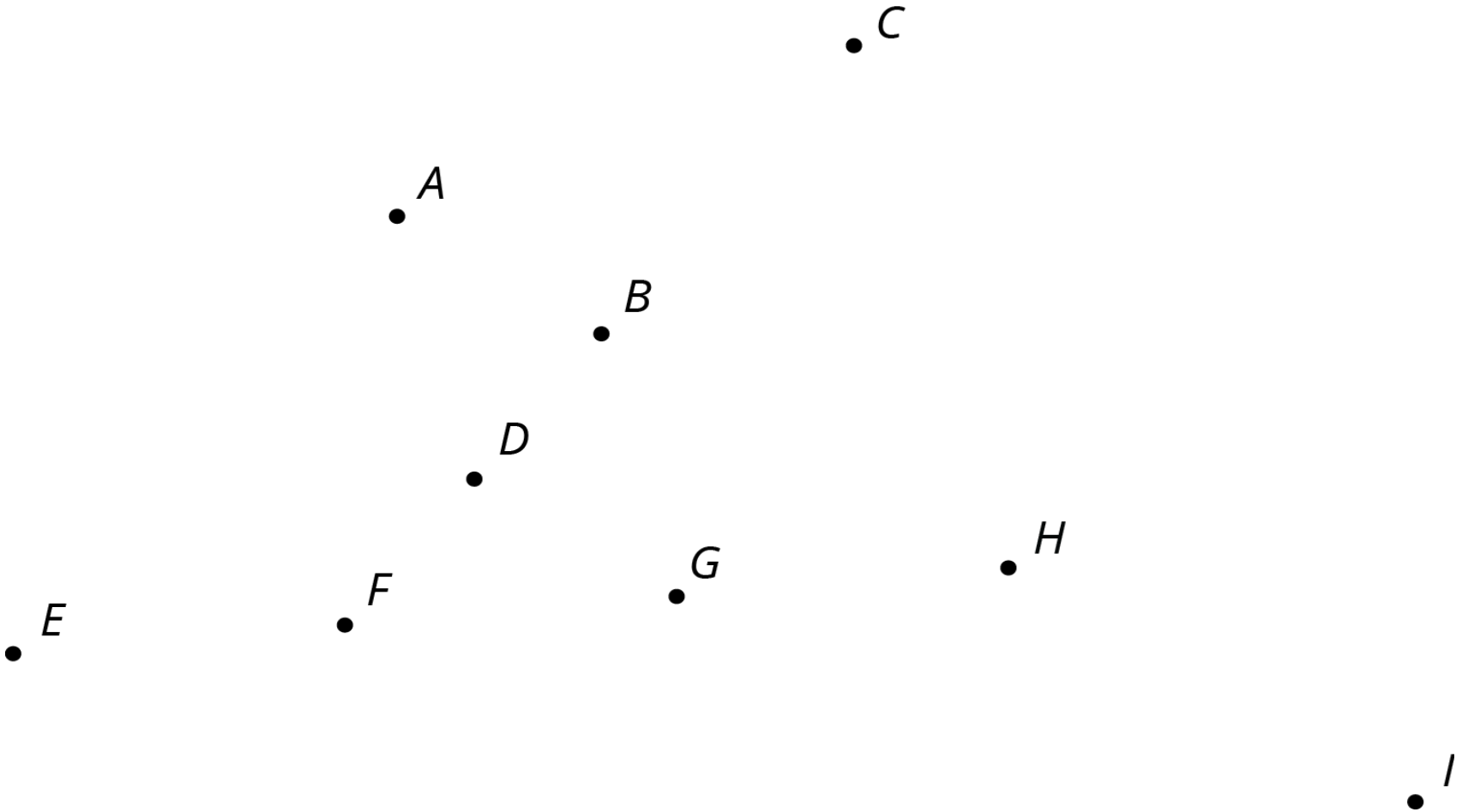
Activity 3.2

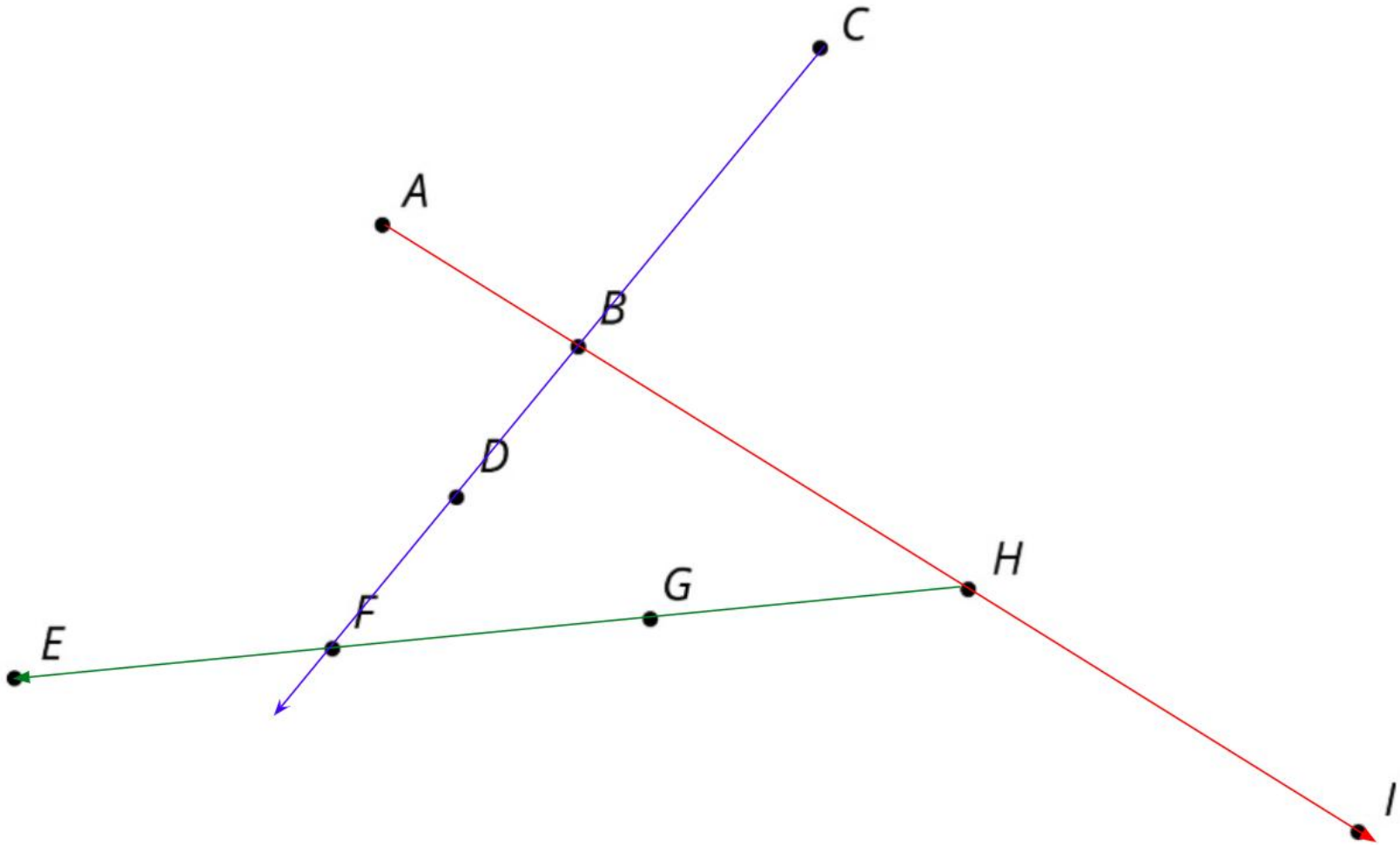
- Three Reads
- Discussion Supports

Please work on answering the first question, then pause.

Continue working on the remaining questions.

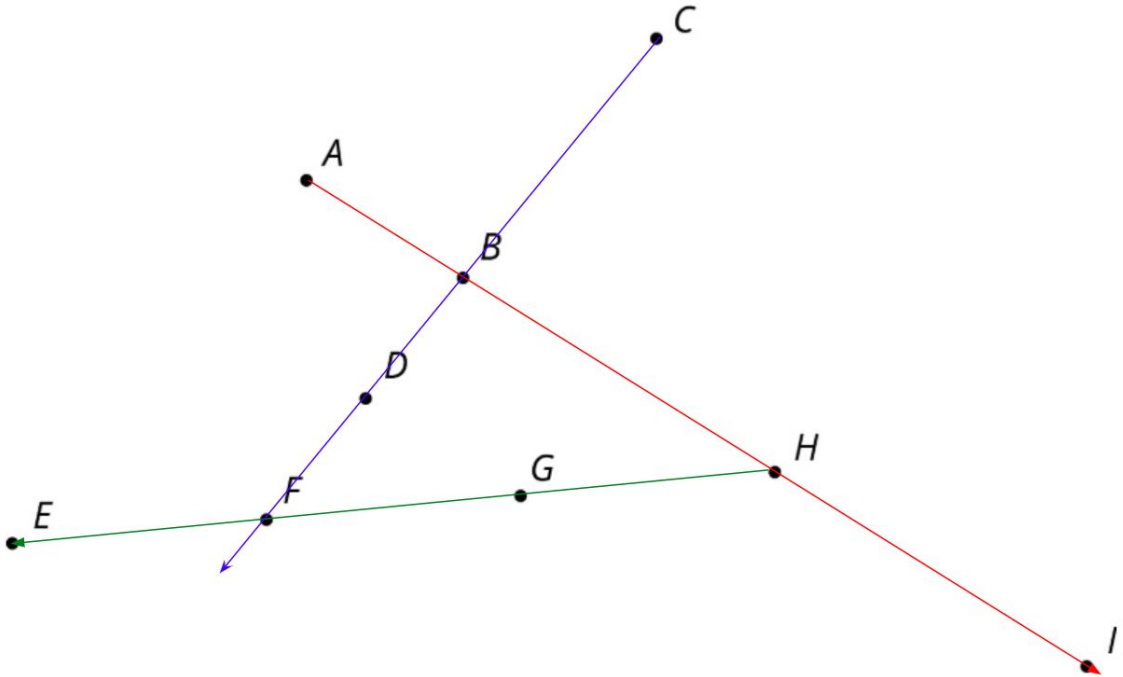



C
A
B
D
H
G
F
E
I

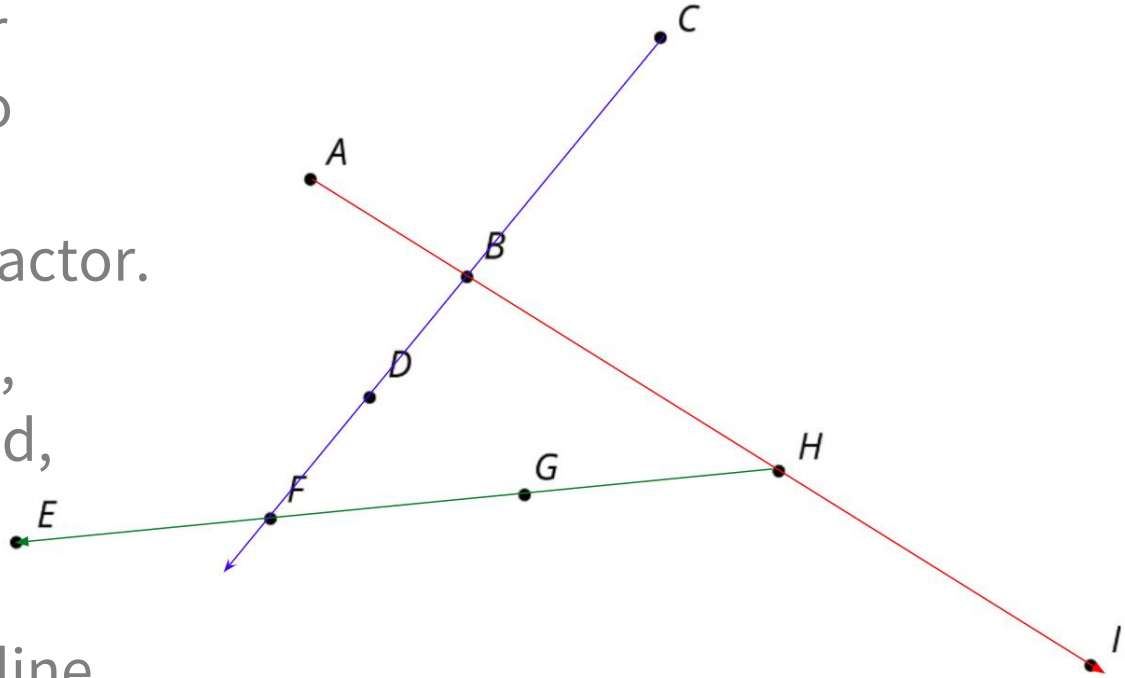

C
A
B
D
H
G
F
E
I

What did you notice about the answers to all of the questions?

What did you notice about the scale factors for dilating *G* to *E* and dilating *E* back to *G*?



- ★ One way to reverse or "undo" a dilation is to use the same center and reciprocal scale factor.
- ★ The center of dilation, the point being dilated, and the image of the point after dilation must lie on the same line.



- ★ A scale factor of 1 does not move any points. If the scale factor is not 1, only one point does not move (the center of dilation).

Getting Perspective

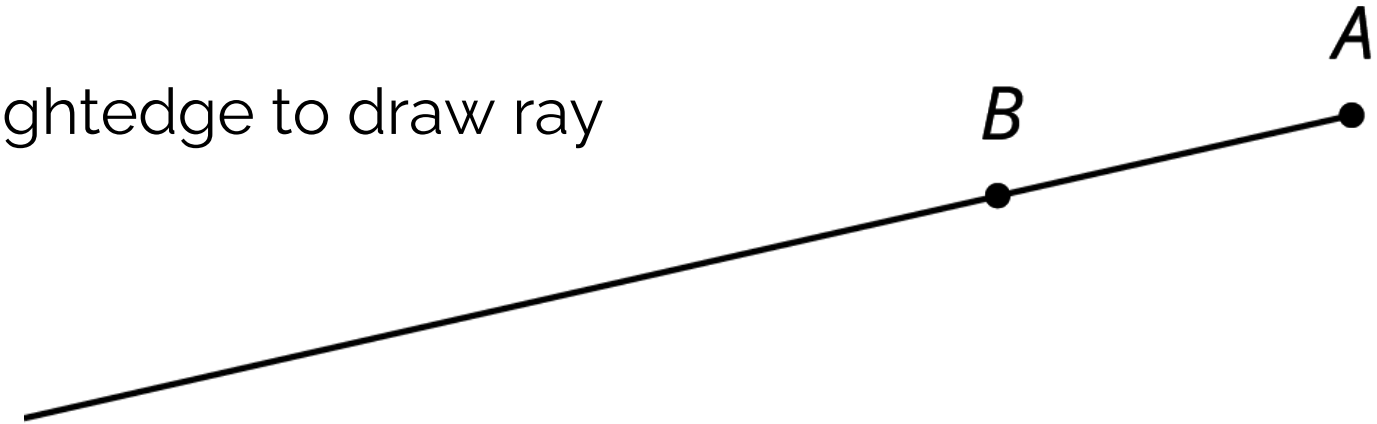
Activity 3.3

- Compare and Connect

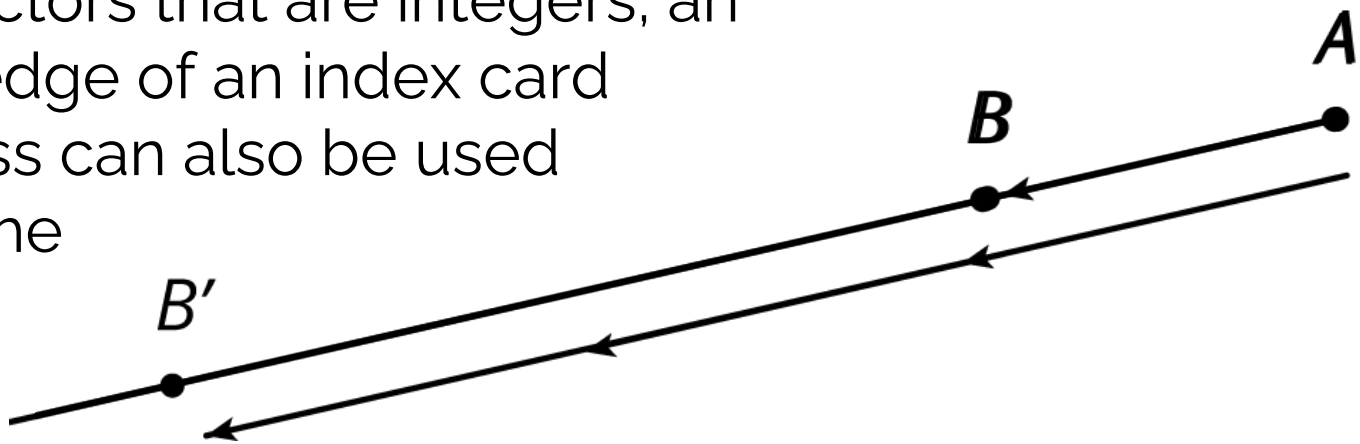
Let’s demo how to dilating a point on a plane with no grid!

We want to dilate point B using A as the center of dilation and a scale factor of 3.

Use a straightedge to draw ray AB.



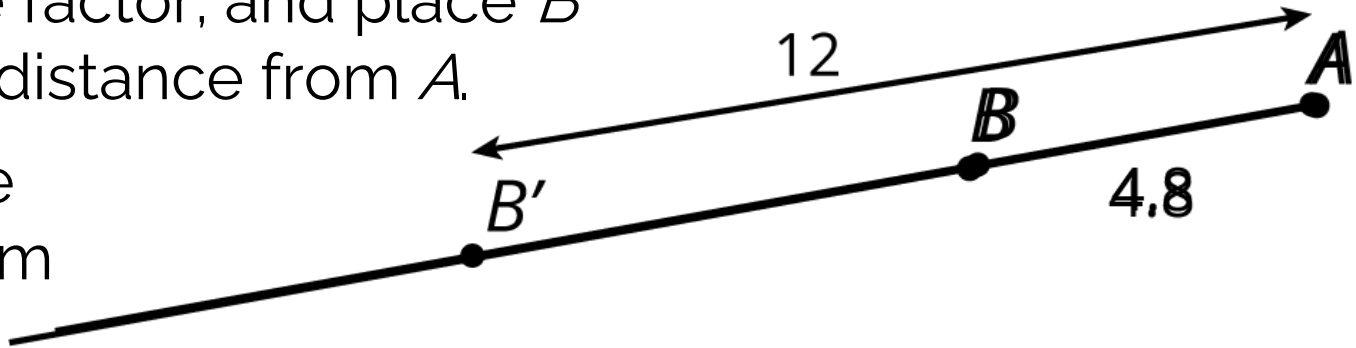
Measure the distance from *B* to *A*.
Multiply the distance by 3 (the scale factor).
Draw *B'* so that it is 3 times as far away from *A*.
For scale factors that are integers, an unmarked edge of an index card or a compass can also be used to transfer the distance along the ray.



If we wanted a scale factor that is not an integer, the procedure is the same!

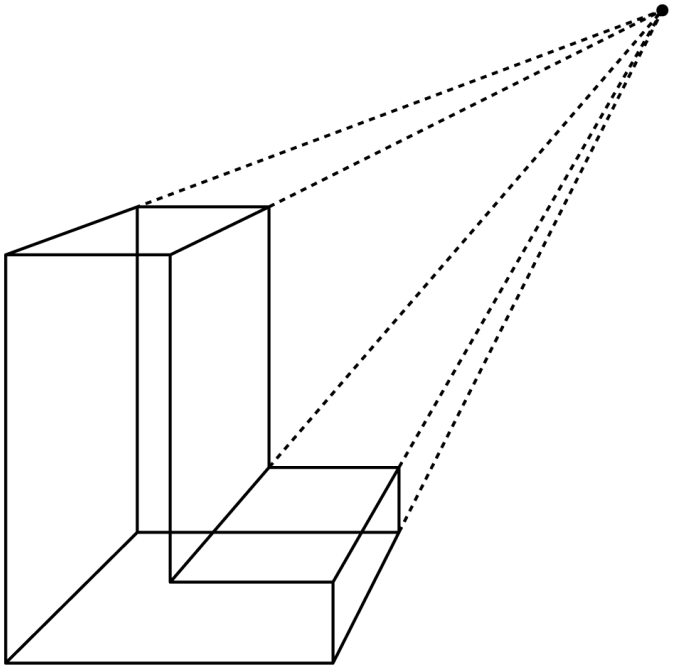
Measure the distance from *A* to *B*, multiply by the scale factor, and place *B'* at that new distance from *A*.

Let's say the distance from *A* to *B* is 4.8 cm.



If we wanted to use a scale factor of 2.5, the distance from *A* to the dilated point *B'* would be 12 cm. **(4.8) • (2.5) = 12**

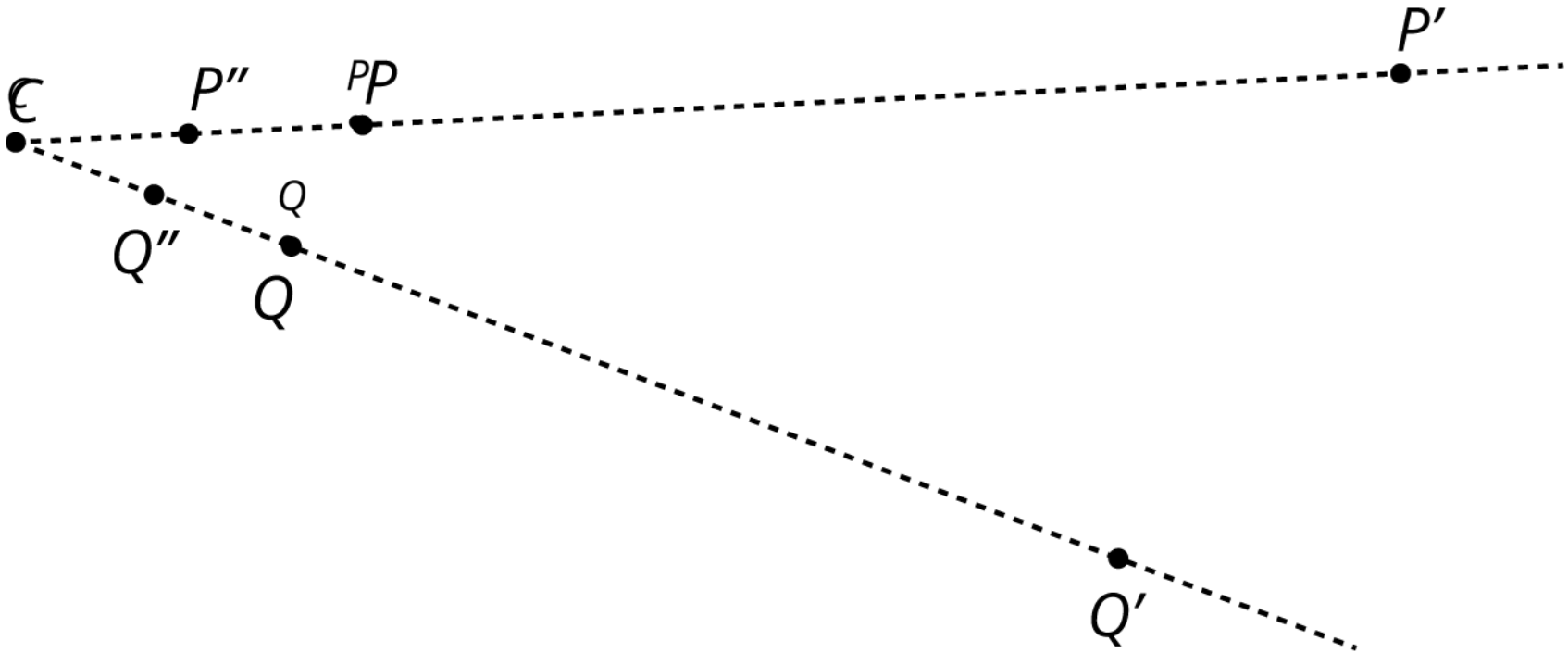
perspective drawing

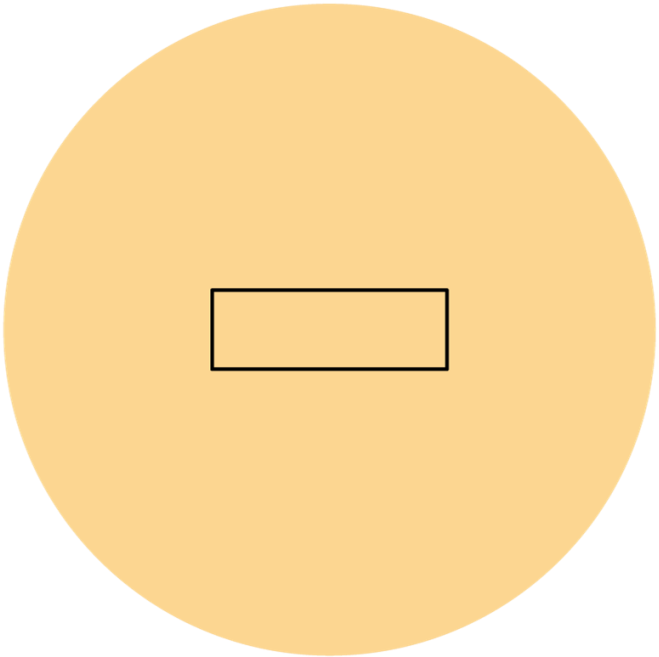


an optical illusion that makes an image printed on paper have a 3D look

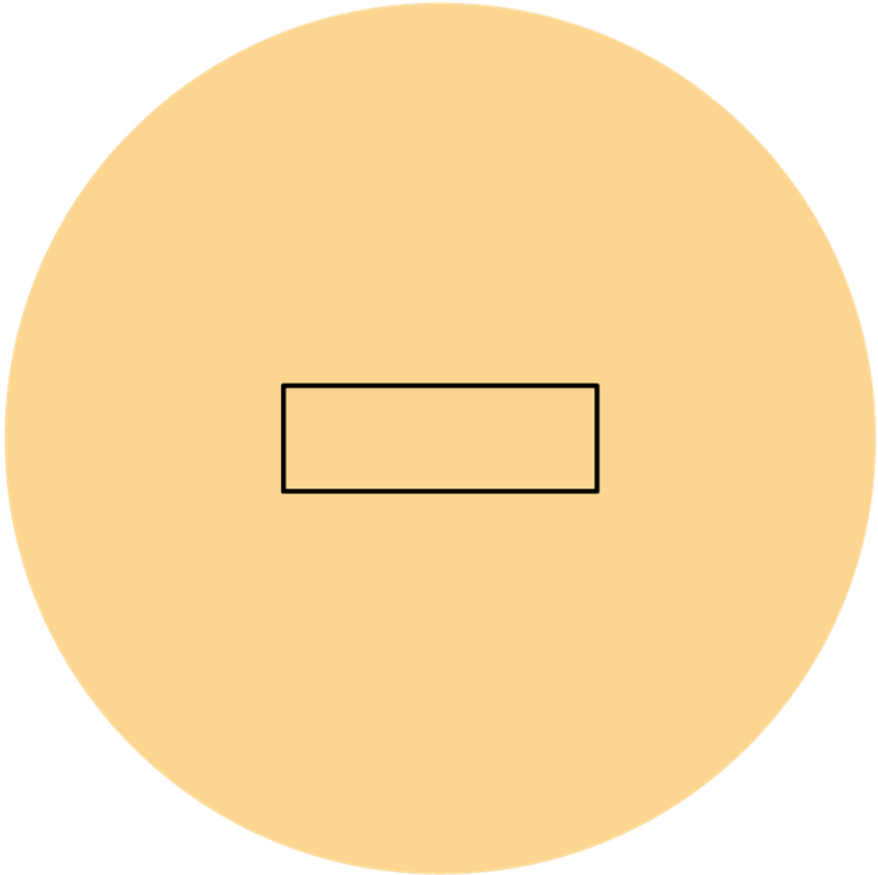
Let's practice some dilations of points!

Complete the first two questions, dilation points *P* and *Q*.

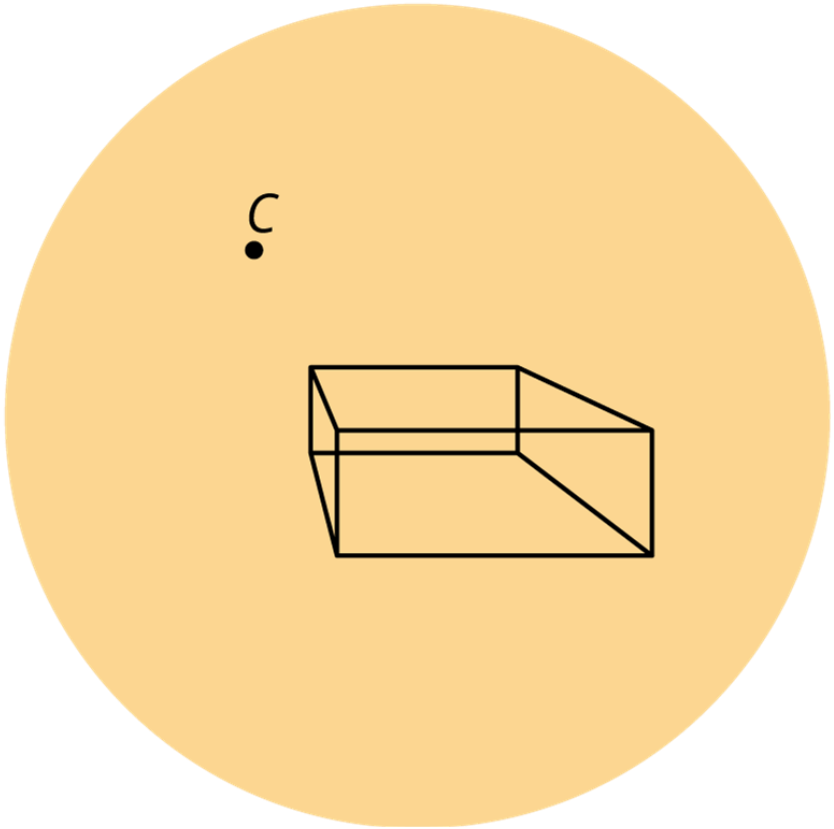

P′
P″
P
Q
Q″
Q
Q′



Now, let’s make a perspective drawing!



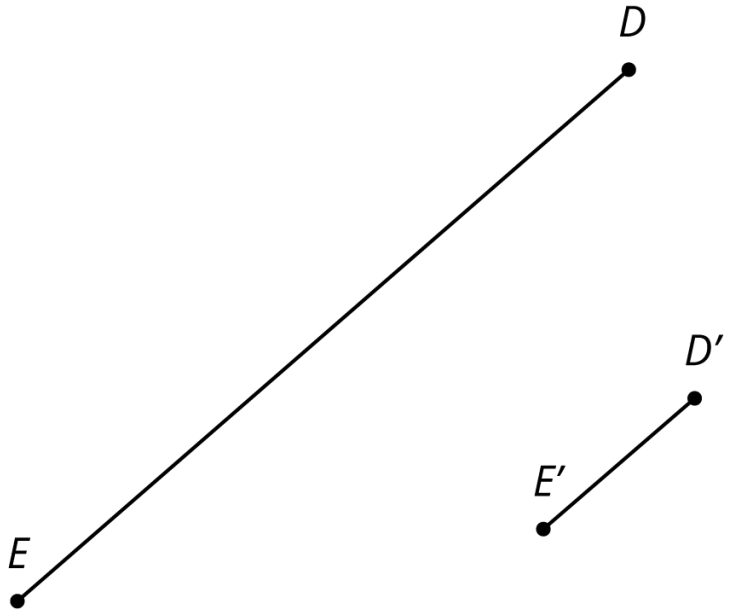
- What are the effects of using a scale factor **greater than 1**?
- What are the effects of using a scale factor **less than 1**?
- What effect does the location of *C*, the center of dilation have?



“Are you ready for more?”

Here is line segment *DE* and its image *D’E’* under a dilation.

1. Use a ruler to find and draw the center of dilation. Label it *F*.
2. What is the scale factor of the dilation?



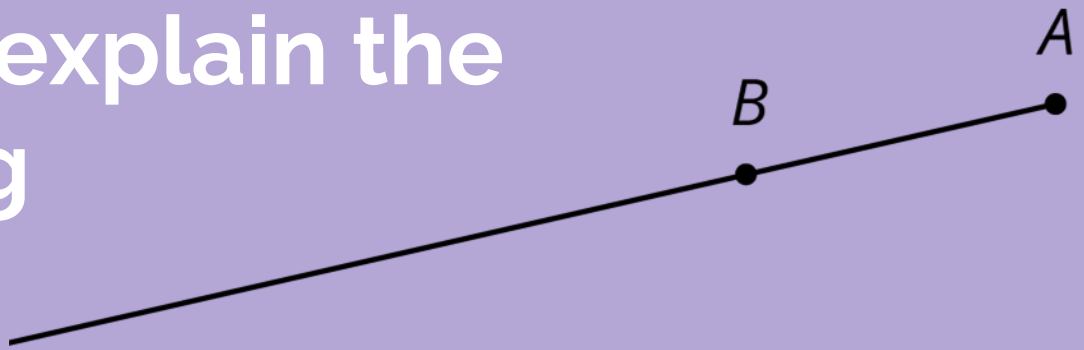
Activity Title

Activity

vocabulary word

definition

How would you explain the steps for dilating a point?



1. Identify the point being dilated, the center of dilation, and the scale factor.
2. Use a straightedge to draw a ray from the center through the point being dilated.
3. Measure the distance from the center of dilation through the point. Multiply by the scale factor. Place the new point at that distance from the center and on the ray.

What are the effects of using a scale factor greater than 1?

the new point will be farther from the center than the original point

What are the effects of using a scale factor less than 1?

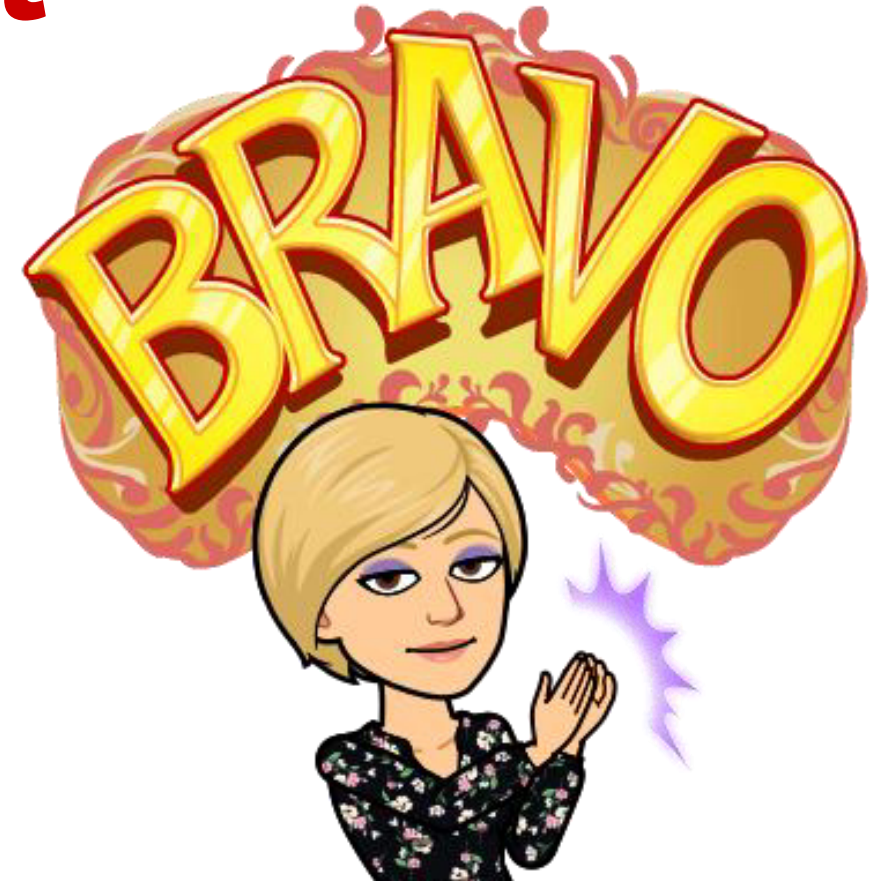
the new point will be closer to the center than the original point

What are the effects of using a scale factor equal to 1?

the new point will be in the same place as the original point

Today's Goal

- I can apply a dilation to a polygon using a ruler.



A Single Dilation of a Triangle

Cool Down 3.4