

# Geometry Unit 9: Dilation and similarity

Bronx Early College Academy

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13 March 2023 - 31 March 2023

9.1 Dilation introduction	13 March
9.2 Solving for $k$ , similarity	15 March
9.3 Overlapping triangle practice	16 March
9.4 Composition	17 March
9.5 Composition	21 March
9.6 Midline and medians	22 March
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9.8 Scaling	29 March
9.9 Scaling	30 March

# Learning Target: I can dilate a triangle

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.1 Monday 13 March

Do Now

1.  $12 \times \frac{1}{3} =$

2.  $10 \times \frac{7}{5} =$

3. Find  $x$  if  $9 \cdot x = 15$

Lesson: Dilation, transformations, fraction operations

Test results, check Jumprope

Homework: Complete the classwork practice, Deltamath problem set

## A dilation centered at the origin with scale factor $k = 2$

$$\triangle ABC \rightarrow \triangle A'B'C'$$

$$A(0, 0) \rightarrow A'(0, 0)$$

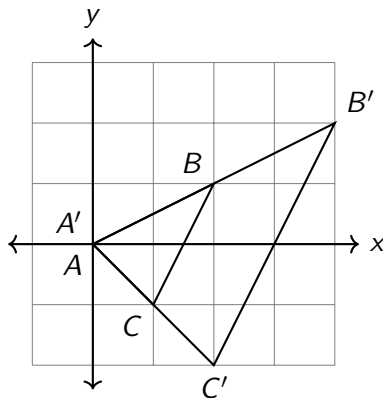
$$B(2, 1) \rightarrow B'(4, 2)$$

$$C(1, -1) \rightarrow C'(2, -2)$$

**Dilation** A transformation stretching objects on the plane by a scale factor away from a point

**Center** Dilation stretches figures away from a stationary point, the “center of dilation”

**Scale factor** The ratio  $k$  of the lengths of the corresponding sides of dilated figures

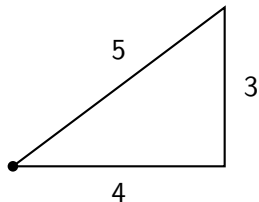


## Learning Target: I can identify and explain similarity

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.2 Wednesday 15 March

Do Now: A triangle with side lengths 3, 4, and 5 is dilated by a factor of  $k = 2$  centered at one of its vertices. Find the lengths of the image's sides.



Lesson: Similar objects, solving for scale factor  $k$

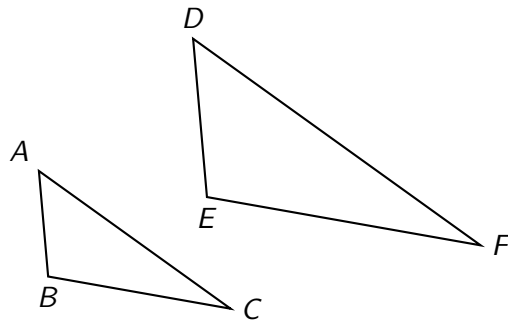
Homework: Complete the classwork practice, Deltamath problem set

# Similarity, corresponding parts, and scaled proportions

**Similarity** Objects with the same shape, but not necessarily the same size, are similar. Their corresponding angles are congruent and their corresponding sides are proportional.

**Notation** This is the symbol for similar triangles:  $\triangle ABC \sim \triangle DEF$

**Definition** Two figures are similar if one or more rigid motions and a dilation will carry one figure onto the other.



# Learning Target: I can solve overlapping similar triangles

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.3 Thursday 16 March

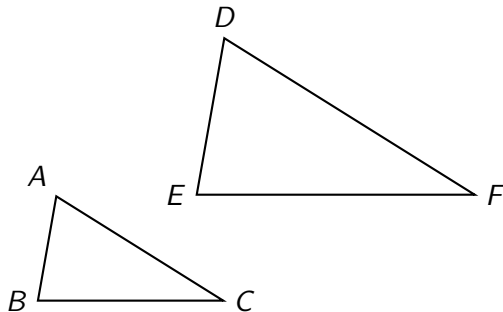
Do Now: Given  $\triangle ABC \sim \triangle DEF$ ,  $k = 2$

If  $BC = 4$ , find  $EF$

If  $m\angle B = 80^\circ$ , find  $m\angle E$

Lesson: Flexibly applying similarity to situations

Homework: Complete the classwork practice, Deltamath problem set

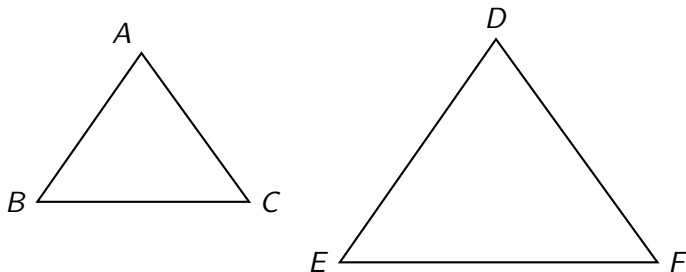


“Solve” a triangle by finding all of its sides' and angles' measures

Given  $\triangle ABC \sim \triangle DEF$

$BC = 4$ ,  $EF = 6$ ,  $AB = 3$

$m\angle B = 55^\circ$ ,  $m\angle D = 70^\circ$





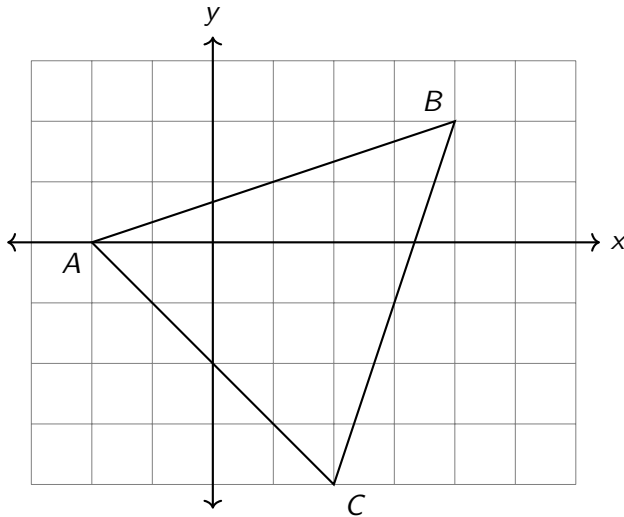
Apply a dilation centered at the origin with scale factor  $k = \frac{1}{2}$

$$\triangle ABC \rightarrow \triangle A'B'C'$$

$$A(-2, 0) \rightarrow$$

$$B(4, 2) \rightarrow$$

$$C(2, -4) \rightarrow$$



Apply a dilation centered at the origin with scale factor  $k = \frac{1}{2}$

$$\triangle ABC \rightarrow \triangle A'B'C'$$

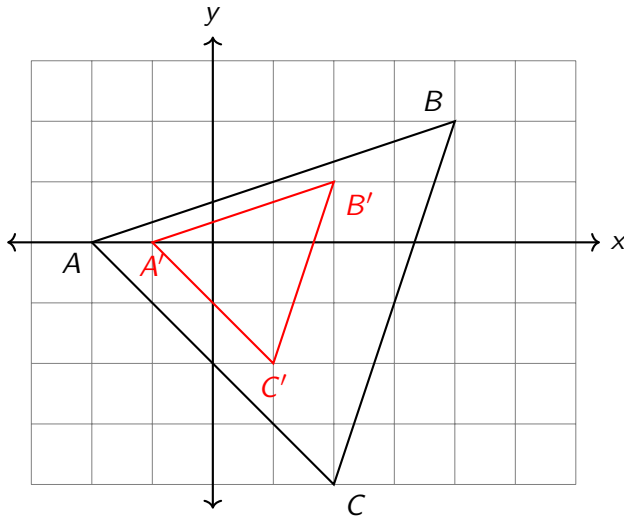
$$A(-2, 0) \rightarrow A'(-1, 0)$$

$$B(4, 2) \rightarrow B'(2, 1)$$

$$C(2, -4) \rightarrow C'(1, -2)$$

Note:

Slope is invariant under dilation



# Learning Target: I can compose dilations with other transformations

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.4 Friday 17 March

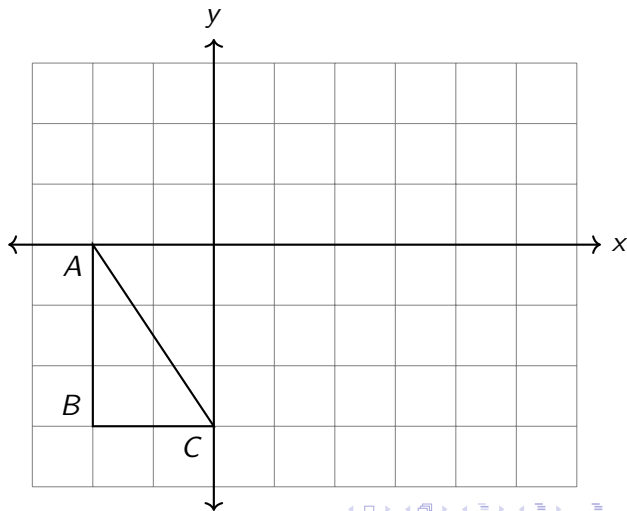
Do Now:

First reflect  $\triangle ABC$  over the  $y$ -axis

Then slide it up one and the right 3

Lesson: Applying dilation and rigid motions in compositions

Homework: Complete the classwork practice, Deltamath problem set



# Learning Target: I can compose dilations with other transformations

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.4 Friday 17 March

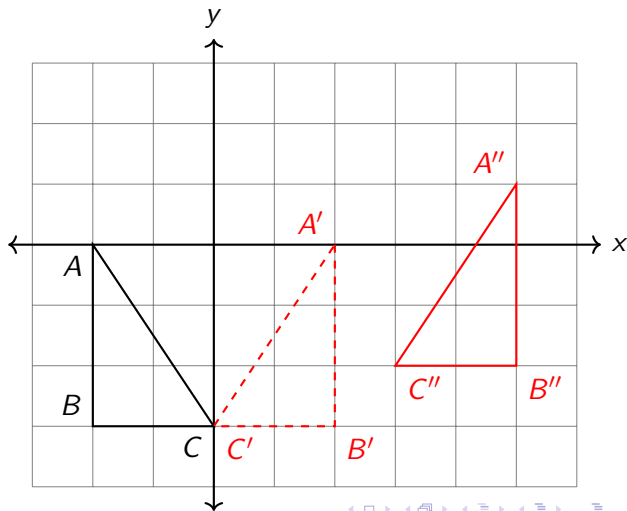
Do Now:

First reflect  $\triangle ABC$  over the  $y$ -axis

Then slide it up one and the right 3

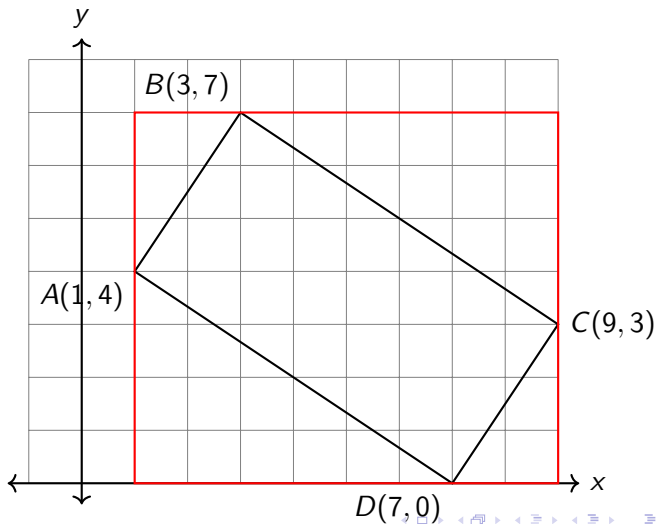
Lesson: Applying dilation and rigid motions in compositions

Homework: Complete the classwork practice, Deltamath problem set



# Find the area of the large and small rectangles

(use the areas of the small triangles)



# Learning Target: I can compose dilations with other transformations

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.5 Tuesday 21 March

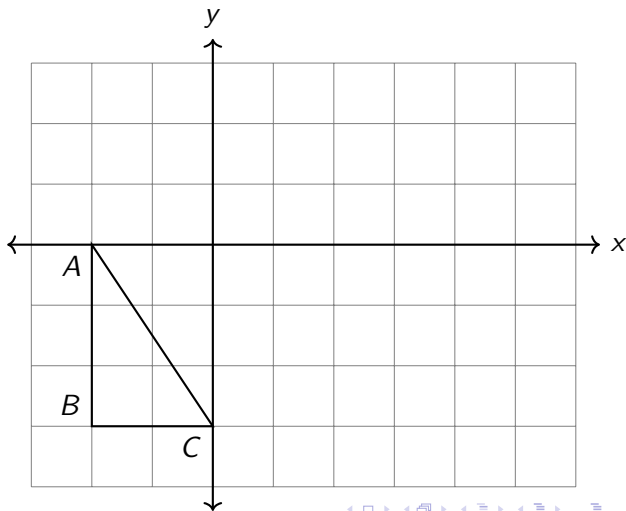
Do Now:

First reflect  $\triangle ABC$  over the  $y$ -axis

Then slide it up one and the right 3

Lesson: Applying dilation and rigid motions in compositions

Homework: Complete the classwork practice, Deltamath problem set



# Learning Target: I can compose dilations with other transformations

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.5 Tuesday 21 March

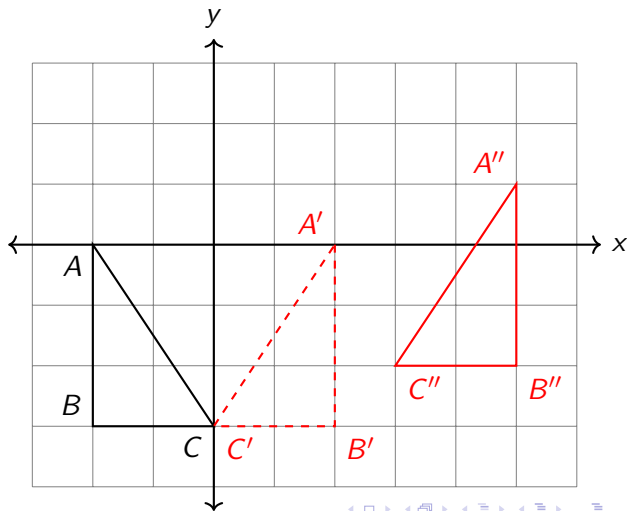
Do Now:

First reflect  $\triangle ABC$  over the  $y$ -axis

Then slide it up one and the right 3

Lesson: Applying dilation and rigid motions in compositions

Homework: Complete the classwork practice, Deltamath problem set



# Learning Target: I can plot triangle midlines and medians

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

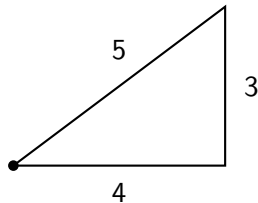
9.6 Wednesday 22 March

Do Now:

Rotating the triangle around its longer leg will make what 3-dimensional shape?

Lesson: Regents pointers. Be on time tomorrow.

Homework: Complete the classwork practice, Deltamath problem set





# Learning Target: I can plot triangle midlines and medians

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.7 Friday 24 March

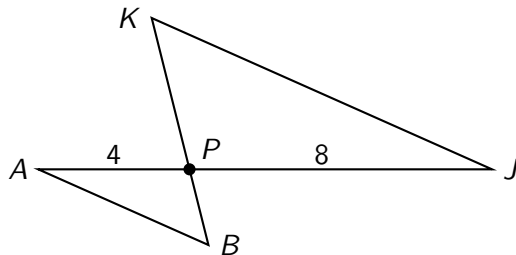
Do Now:

What sequence of transformations  
map similar triangles

$\triangle ABP \rightarrow \triangle JKP$ ?

Lesson: Midlines and triangle  
medians

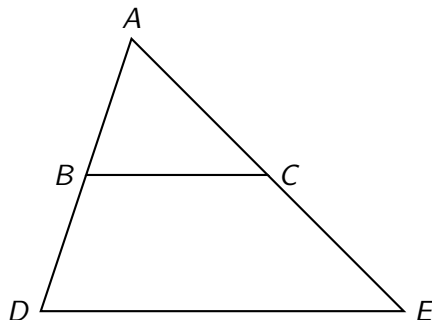
Homework: Complete the classwork  
practice, Deltamath problem set



## Triangle midline and medians create similar triangles

**Midpoint** The point on a segment that divides the segment into two equal parts.

**Midline** The line segment that connects the midpoints of two sides of a triangle.



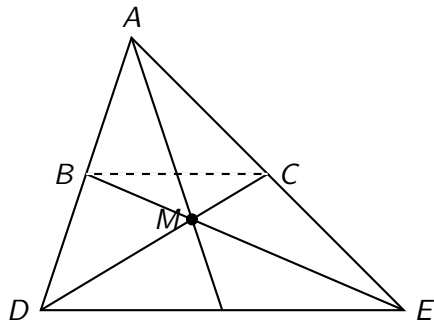
## Triangle midline and medians create similar triangles

**Midpoint** The point on a segment that divides the segment into two equal parts.

**Midline** The line segment that connects the midpoints of two sides of a triangle.

**Medians** Segments connecting a vertex to the midpoint of the opposite side.

**Centroid** The point where the three medians intersect.



# Learning Target: I can scale area and perimeter

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.8 Wednesday 29 March

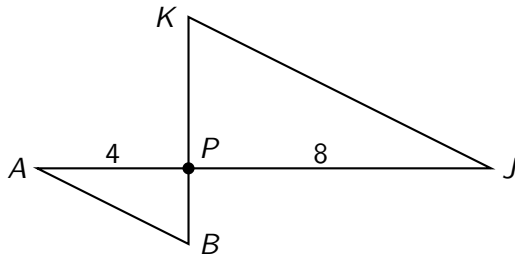
Do Now:

What sequence of transformations  
map similar triangles

$\triangle ABP \rightarrow \triangle JKP$ ?

Lesson: Scale factor  $k$ , area scales  
by  $k^2$ , volume by  $k^3$

Homework: Complete the classwork  
practice, Deltamath problem set



# Learning Target: I can prove triangles similar using AA similarity

HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.9 Thursday 30 March

Do Now:

Given  $\triangle ABC \sim \triangle XYZ$ ,  $m\angle A = 50^\circ$ ,  $m\angle Y = 60^\circ$

Find the remaining angle measures.

Lesson: Triangles with congruent corresponding angles are similar

Homework: Complete the classwork practice, Deltamath problem set

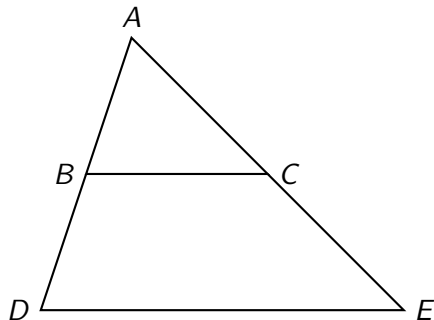
# Theorem of AA Similarity

**Corresponding** Parts (sides or angles) of two triangles that are in the same position.

**AA Similarity** If two triangles have two corresponding angles congruent, then the triangles are similar.

**Converse** If two triangles are similar, then their corresponding angles are congruent.

**Reflexive** Every angle is congruent to itself. The reflexive property.



## Notebook check scoring

Start quickly at the beginning of class: notebook, pencil, folder, calculator; get to work

Jumprope mastery score

1. I have a notebook  $\rightarrow$  1
2. I have class notes  $\rightarrow$  2
3. I have stars indicating I quickly sit down and write the learning target  $\rightarrow$  3
4. I have stars and I complete the Do Now right away  $\rightarrow$  4