

Geometry Unit 11: Regents review

Bronx Early College Academy

Christopher J. Huson PhD

9 June 2023

1.1 Symmetry and dilation situations

9 June

Learning Target: I can dilate a triangle

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

11.1 Friday 9 June

Do Now

1. $\sin 55 = \cos(x + 5)$. Find x .
2. Find the equation of a line through $(3, 1)$ with slope $m = 2$.
3. Find the slope of a line perpendicular to $y = \frac{1}{2}x + 3$.

Lesson: Regents similar triangles

Upload problem set Regents Aug '17

Homework: Deltamath problem set

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

$$\triangle ABC \rightarrow \triangle A'B'C' \text{ and } \triangle ABC \sim \triangle A'B'C'$$

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

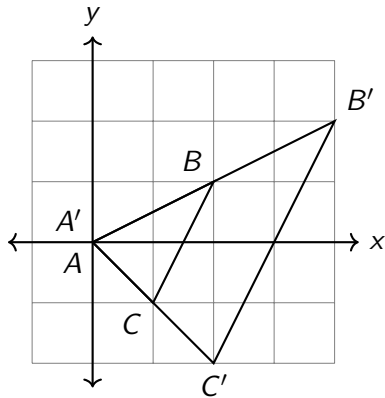
$$B(2, 1) \rightarrow B'(4, 2)$$

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

Use the letters Corresponding parts are in order

Mappings Write down what happens to each part using arrow notation \rightarrow

Scale factor Calculate $k = \frac{\text{new}}{\text{old}}$ or $\text{new} = k \times \text{old}$

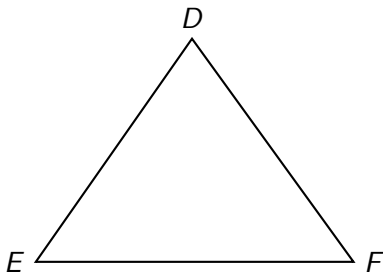
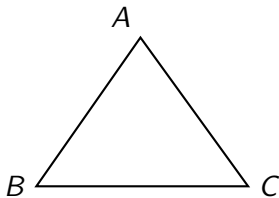


“Solve” a triangle by finding all of its sides' and angles' measures

Given $\triangle ABC \sim \triangle DEF$

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

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



Rotation and dilation situations

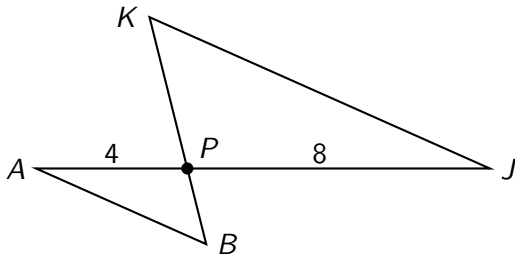
HSG.SRT.B.5 Use similarity criteria for triangles to solve problems

9.7 Friday 24 March

What sequence of transformations
map similar triangles

$\triangle ABP \rightarrow \triangle JKP$?

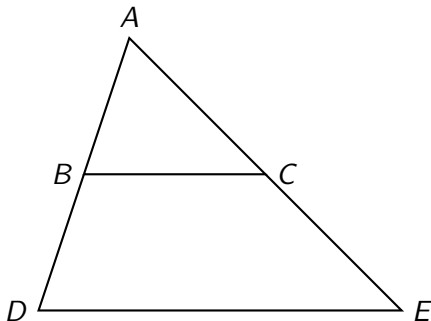
Scale factor k , area scales by k^2 ,
volume by k^3



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.



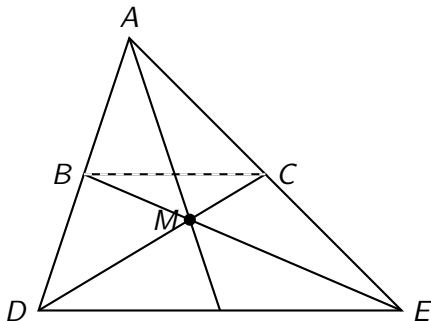
Triangle midline and medians create similar triangles

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.



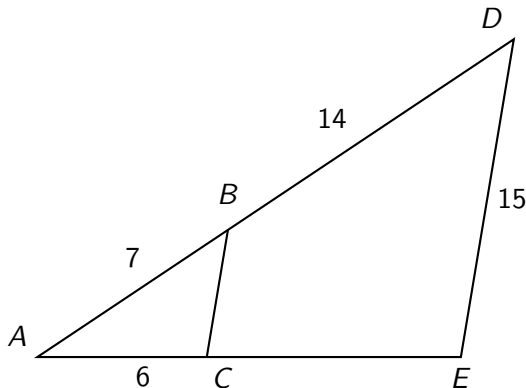
Overlapping triangles

$$\triangle ABC \cong \triangle ADE$$

$$AB = 7, AC = 6, BD = 14, \\ DE = 15.$$

Find AD and the scale factor k .
Then find AE and BC .

1. $AD =$
2. $k =$
3. $AE =$
4. $BC =$



Overlapping, reflected triangles

$\triangle ABC$, with \overline{AEB} , \overline{ADC} . $AB = 14$, $AD = 8$, and $DE = 4$.
 $\angle ACB \cong \angle AED$

1. $\overline{AE} \rightarrow$ _____

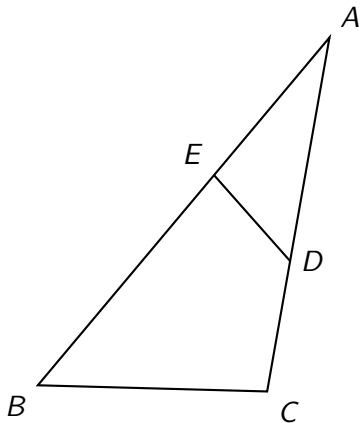
2. $\overline{AD} \rightarrow$ _____

3. $\triangle ADE \sim$ _____

4. What is the scale factor?

$k =$ _____

5. What is the length of \overline{BC} ?

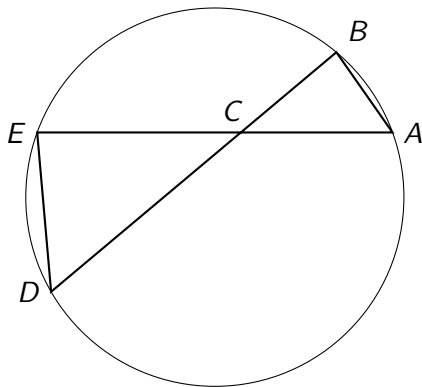


Circle situations

Chords \overline{AE} and \overline{BD} intersect at C

$$\triangle ABC \sim \triangle DEC.$$

1. Which angle is congruent to $\angle E$?
2. Given $BC = 3$, and $EC = 6$.
Find the scale factor k .
3. $AC = 4$, find CD .



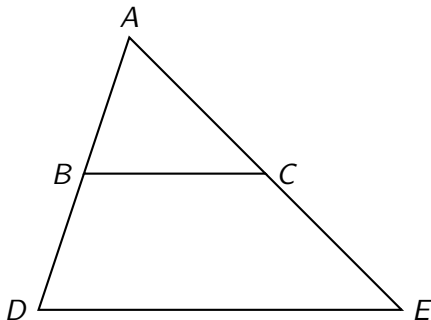
Proofs with similarity

Congruent angles If two triangles have two corresponding angles congruent, then the triangles are similar. AA Similarity (abbreviated AA \sim)

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

SSS \sim Given $\triangle ABC$ with side lengths 5, 12, 13 and $\triangle ADE$ with 10, 24, 26.

“CPCTC” Corresponding parts (sides or angles) of congruent triangles are congruent.



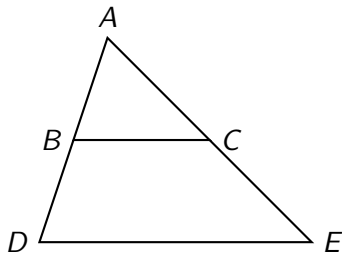
Theorem of SSS Similarity and SAS Similarity

Proportion Ratio or fraction. For a dilation, usually written as $k = \frac{\text{image}}{\text{preimage}}$.

SSS Similarity If two triangles have two corresponding sides in the same proportion, then the triangles are similar.

SAS Similarity If two triangles have two corresponding sides in the same proportion and their included angles are congruent, then the triangles are similar.

Included angle The angle between two sides of a triangle.



Find the area of the large and small rectangles

(use the areas of the small triangles)

