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BECA / Dr. Huson / Geometry 7 Similarity

7.14 Exam: Similarity transformations

I can solve problems using similarity criteria. CCSS.HSG.SRT.B.5

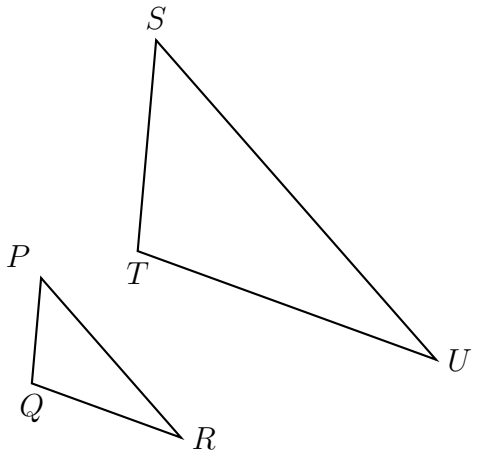
1. A dilation maps triangle PQR onto triangle STU with $QR = 6$ and $TU = 12$.

   (a) $\overline{PR} \rightarrow$ _____

   (b) What scale factor maps $\triangle PQR \rightarrow \triangle STU$?

   (c) Given $PR = 8$, find SU.

   (d) Given $ST = 6$, find PQ.



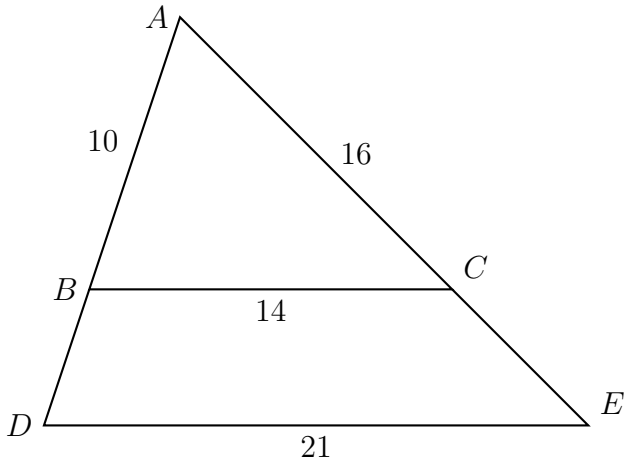
2. Given $\triangle ABC \sim \triangle DEF$, $m\angle A = 55°$, and $m\angle B = 95°$. Find $m\angle E$.

3. Triangle ABC is dilated with a scale factor of k centered at A, yielding $\triangle ADE$, as shown. Given $AB = 10$, $BC = 14$, $AC = 16$, and $DE = 21$.

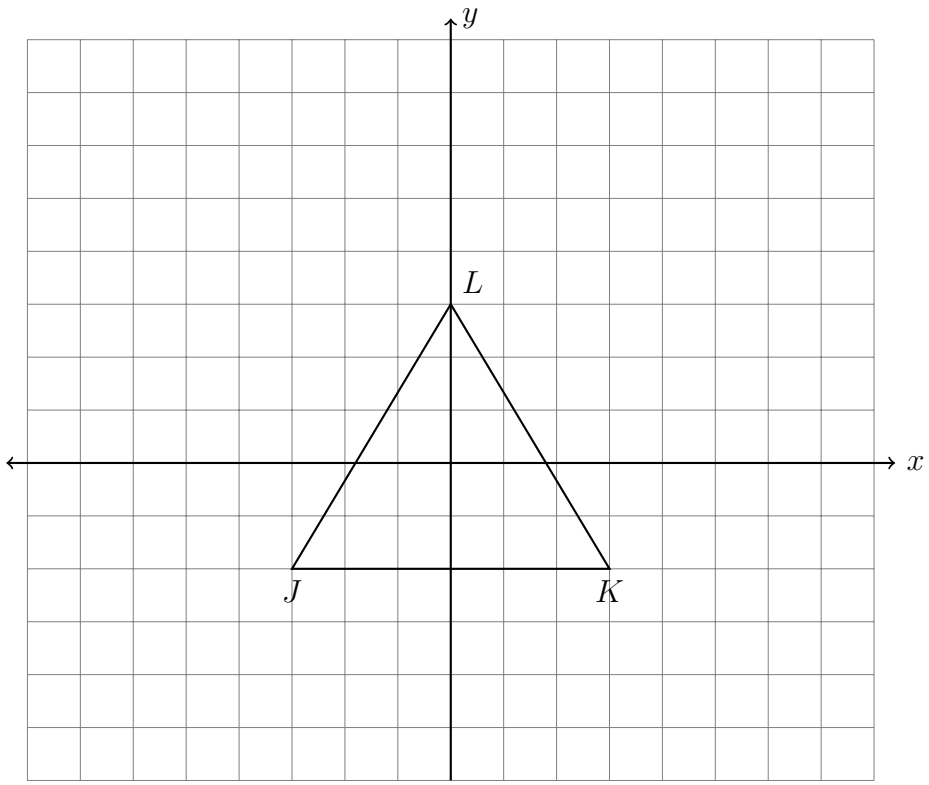
   (a) Find the scale factor, k

   (b) Find AD

   (c) Find CE



4. Dilate $\triangle JKL$ with a scale factor $k = 2$ centered on the origin. Draw the image $\triangle J'K'L'$ and label its vertices. Given $J(-3, -2)$, $K(3, -2)$, and $L(0, 3)$.



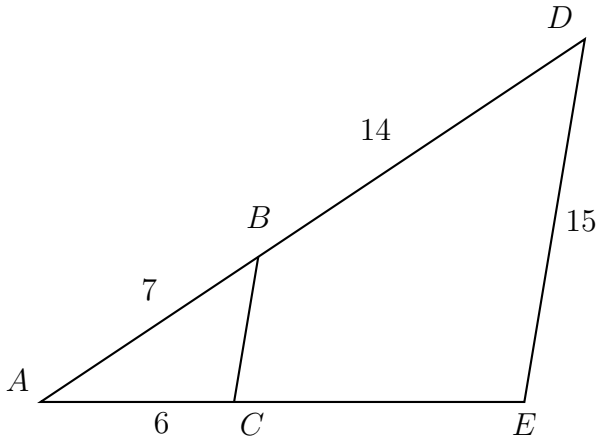
5. In the diagram below, $\angle ABC \cong \angle ADE$, $AB = 7$, $AC = 6$, $BD = 14$, and $DE = 15$. Find AD and the scale factor k. Then find AE and BC.

(a) $AD =$

(b) $k =$

(c) $AE =$

(d) $BC =$



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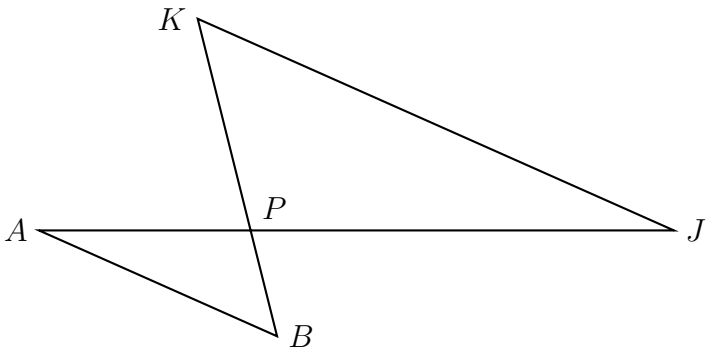
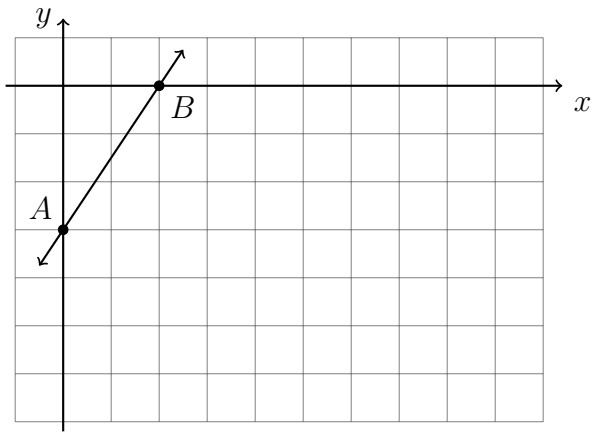
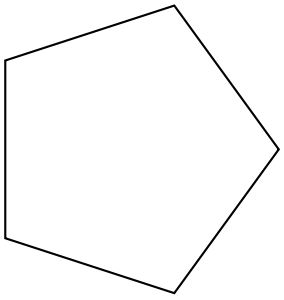
6. Given $\triangle ABP$ and $\triangle JKP$ as shown below. $\overline{AB} \parallel \overline{JK}$. $AP = 7.36$, $JP = 16.56$, and $JK = 18.9$. Find AB.



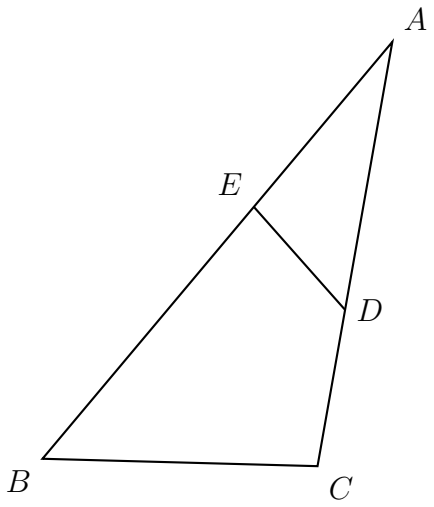
7. The line $\overleftrightarrow{AB}$ has the equation $y = \frac{3}{2}x - 3$. Apply a dilation mapping $\overleftrightarrow{AB} \to \overleftrightarrow{A'B'}$ with a factor of $k = 2$ centered at the origin. Draw and label the image on the grid. Write the equation of the line $\overleftrightarrow{A'B'}$.



8. What is the smallest non-zero angle of rotation about its center that would map the pentagon onto itself?



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



(a) $\overline{AE} \rightarrow$ _____

(b) $\overline{AD} \rightarrow$ _____

(c) $\triangle ADE \sim$ _____

(d) What is the scale factor?

$k =$ _____

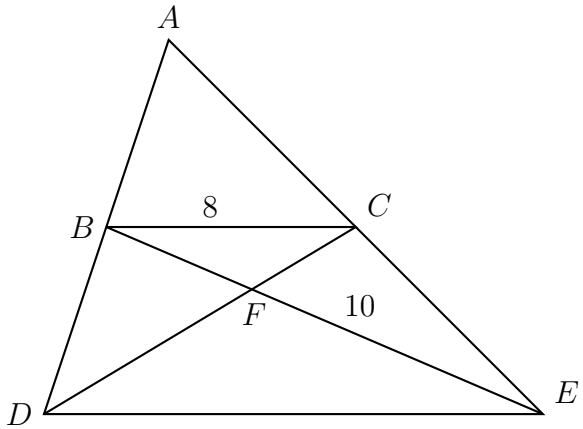
(e) What is the length of $\overline{BC}$?

10. Triangle ADE and its midline $\overline{BC}$ are drawn, with B the midpoint of $\overline{AD}$ and C the midpoint of $\overline{AE}$. The two medians $\overline{BE}$ and $\overline{CD}$ are drawn, as shown, intersecting in point F, the centroid. Given $BC = 8$, $FE = 10$.

(a) Write down DE.

(b) Given $\triangle FCB \sim \triangle FDE$ with scale factor $k = 2$.

Find BF.



(c) Given the area of $\triangle FCB = 12.5$, find the area of $\triangle FDE$.

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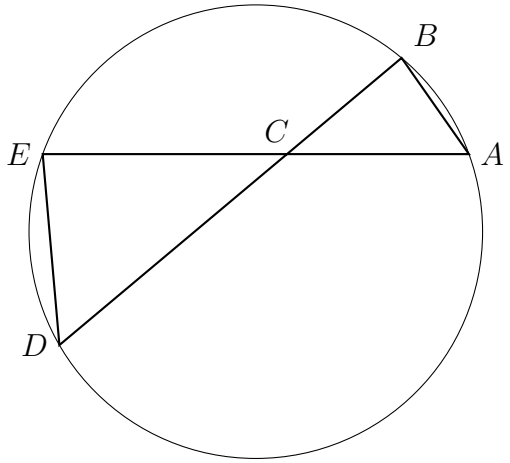
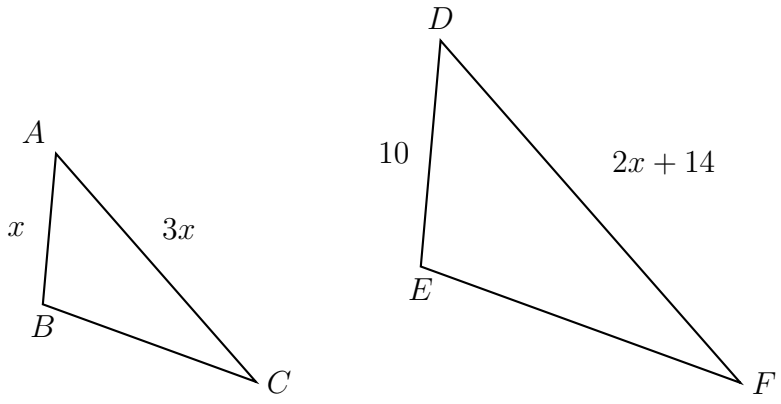
11. In the diagram below, the chords $\overline{AE}$ and $\overline{BD}$ intersect at C, with $\triangle ABC \sim \triangle DEC$, $BC = 3.4$, $AC = 4.2$, and $BD = 9.35$. Determine the length of $\overline{CE}$.

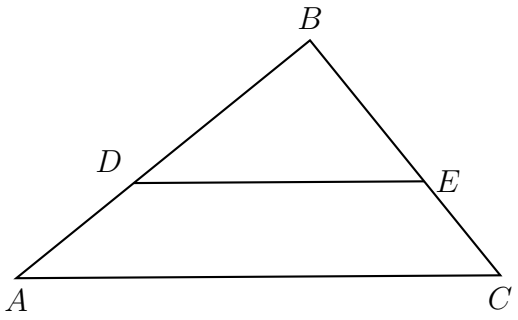


12. In the diagram below $\triangle ABC \sim \triangle DEF$, $DE = 10$, $AB = x$, $AC = 3x$, $DF = 2x+14$. Determine the length of $\overline{AB}$.



13. In triangle ABC, points D and E are on sides of $\overline{AB}$ and $\overline{BC}$, respectively, such that $\overline{DE} \parallel \overline{AC}$, and $BD : DA = 5 : 3$.

    If $DB = 9.0$ and $DE = 10.5$, what is the length of $\overline{AC}$, to the *nearest tenth*?



14. In the diagram below $\triangle ABC \sim \triangle DEF$, $DE = x$, $AB = 3$, $AC = x - 1$, $DF = x + 7$.

    Find x.