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### 10.6 Homework: Similarity transformations

I can solve problems using similarity criteria.

CCSS.HSG.SRT.B.5

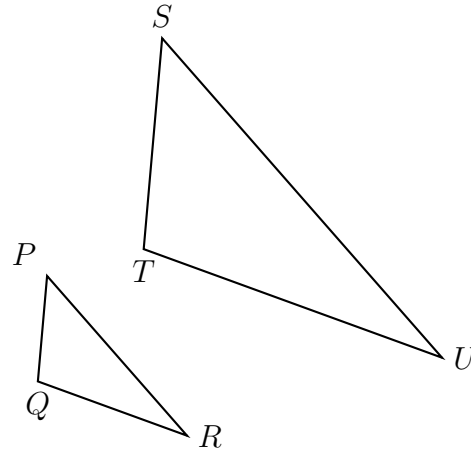
1. A dilation maps triangle  $PQR$  onto triangle  $STU$  with  $QR = 6$  and  $TU = 12$ .

(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  $PQ$ .



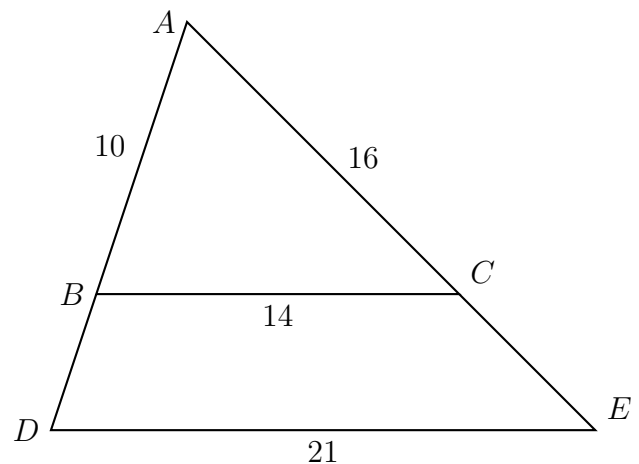
2. Given  $\triangle ABC \sim \triangle DEF$ ,  $m\angle A = 55^\circ$ , and  $m\angle B = 95^\circ$ . Find  $m\angle E$ .

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  $DE = 21$ .

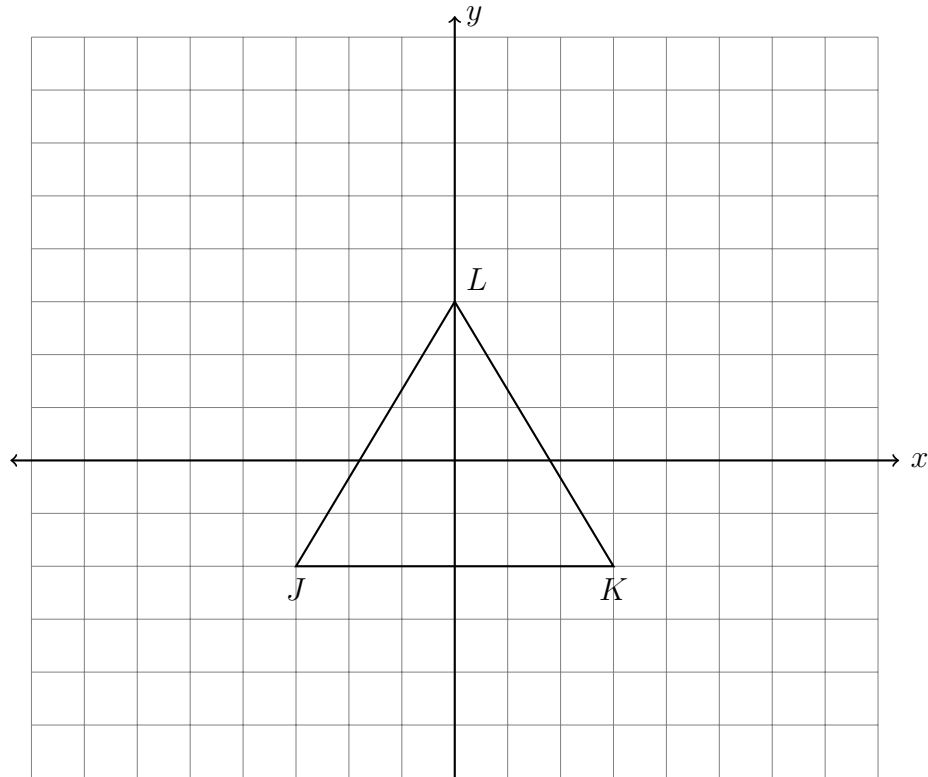
(a) Find the scale factor,  $k$

(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  $L(0, 3)$ .



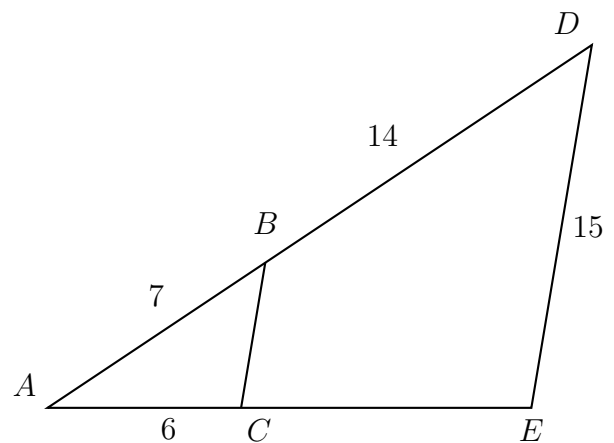
5. In the diagram below,  $\angle ABC \cong \angle ADE$ ,  $AB = 7$ ,  $AC = 6$ ,  $BD = 14$ , and  $DE = 15$ . Find  $AD$  and the scale factor  $k$ . Then find  $AE$  and  $BC$ .

(a)  $AD =$

(b)  $k =$

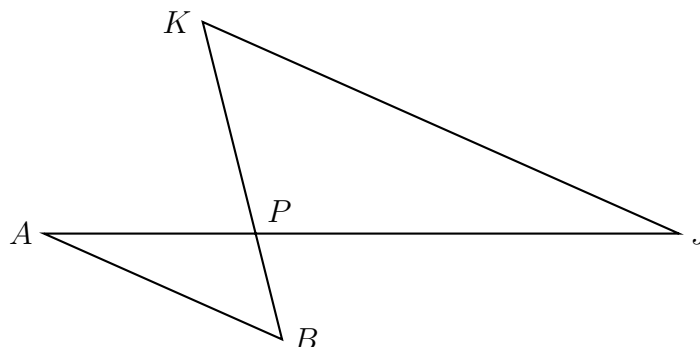
(c)  $AE =$

(d)  $BC =$

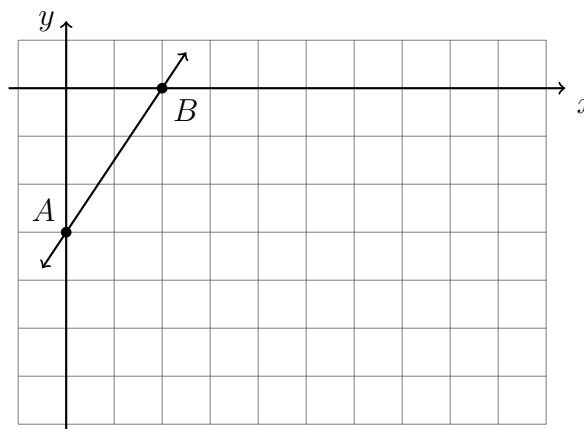


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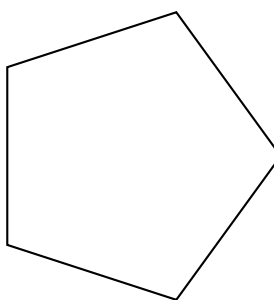
6. Given  $\triangle ABP$  and  $\triangle JKP$  as shown below.  $\overline{AB} \parallel \overline{JK}$ .  $AP = 7.36$ ,  $JP = 16.56$ , and  $JK = 18.9$ . Find  $AB$ .



7. The line  $\overleftrightarrow{AB}$  has the equation  $y = \frac{3}{2}x - 3$ . Apply a dilation mapping  $\overleftrightarrow{AB} \rightarrow \overleftrightarrow{A'B'}$  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)  $\overline{AE} \rightarrow$  \_\_\_\_\_

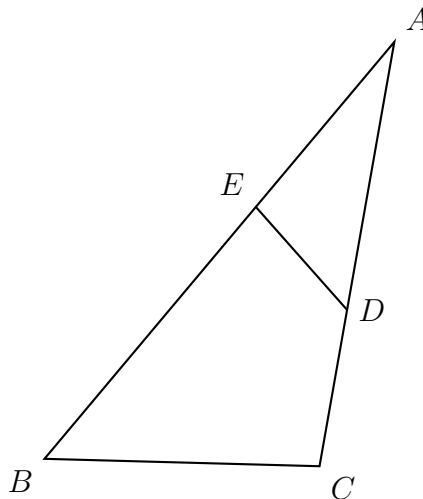
(b)  $\overline{AD} \rightarrow$  \_\_\_\_\_

(c)  $\triangle ADE \sim$  \_\_\_\_\_

(d) What is the scale factor?

$k =$  \_\_\_\_\_

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



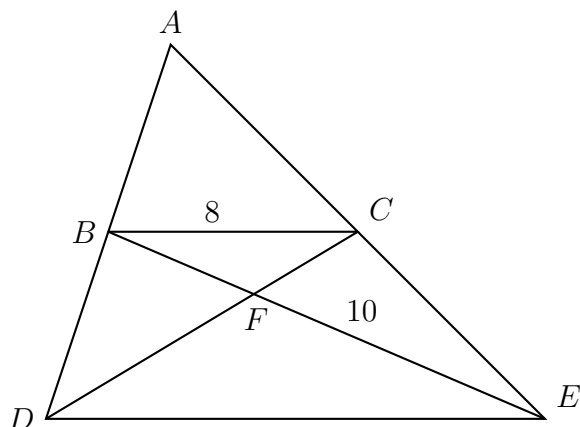
10. Triangle  $ADE$  and its midline  $\overline{BC}$  are drawn, with  $B$  the midpoint of  $\overline{AD}$  and  $C$  the midpoint of  $\overline{AE}$ . The two medians  $\overline{BE}$  and  $\overline{CD}$  are drawn, as shown, intersecting in point  $F$ , the centroid. Given  $BC = 8$ ,  $FE =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

(a) Write down  $DE$ .

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

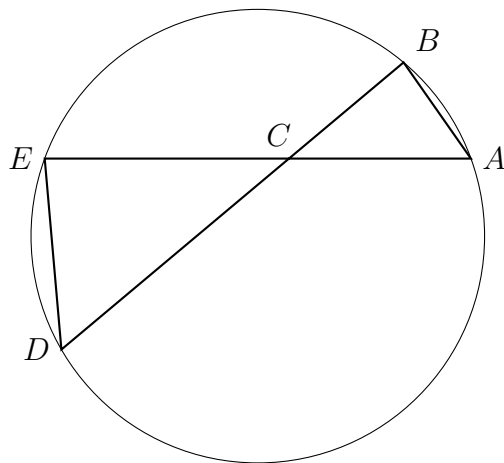
Find  $BF$ .

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

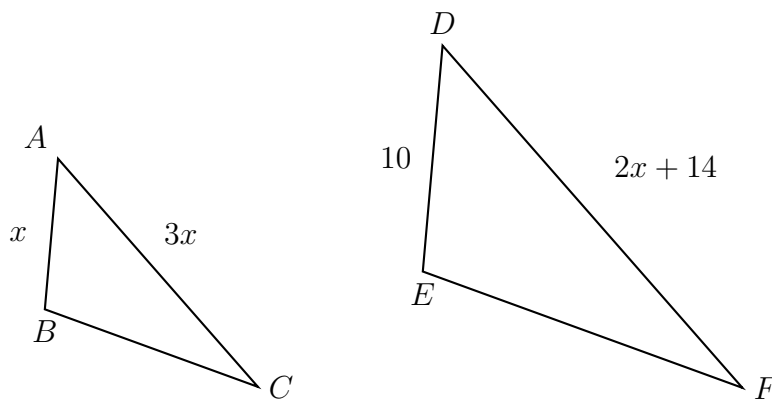


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11. In the diagram below, the chords  $\overline{AE}$  and  $\overline{BD}$  intersect at  $C$ , with  $\triangle ABC \sim \triangle DEC$ ,  $BC = 3.4$ ,  $AC = 4.2$ , and  $BD = 9.35$ . Determine the length of  $\overline{CE}$ .

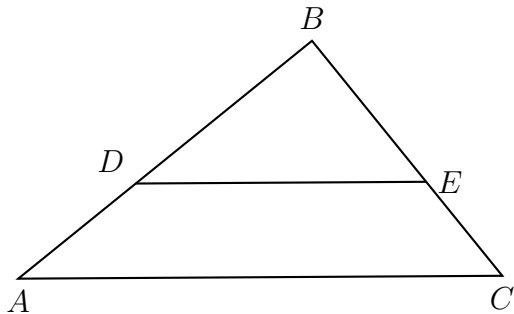


12. In the diagram below  $\triangle ABC \sim \triangle DEF$ ,  $DE = 10$ ,  $AB = x$ ,  $AC = 3x$ ,  $DF = 2x + 14$ . Determine the length of  $\overline{AB}$ .



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  $x$ .

