

### 10.4 Homework: Similarity ratios, dilation, transformations, symmetry

I can solve problems using similarity criteria.

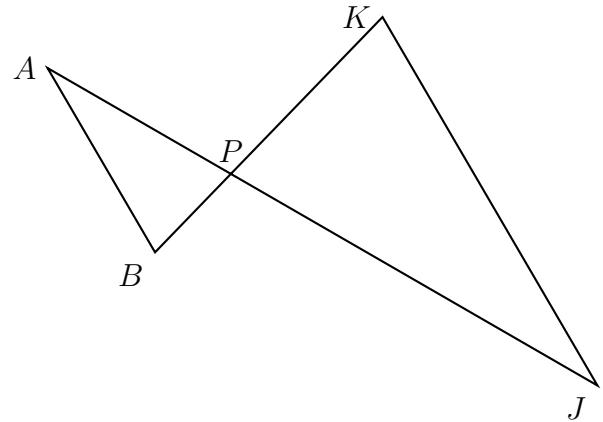
CCSS.HSG.SRT.B.5

1. Do Now: Given  $\triangle PQR \sim \triangle STU$ ,  $m\angle P = 37^\circ$ , and  $m\angle T = 46^\circ$ . Find  $m\angle Q$ .

2. Two triangles are shown with  $P$  the intersection of  $\overline{AJ}$  and  $\overline{BK}$ .

(a) Justify  $\angle APB \cong \angle JPK$ .

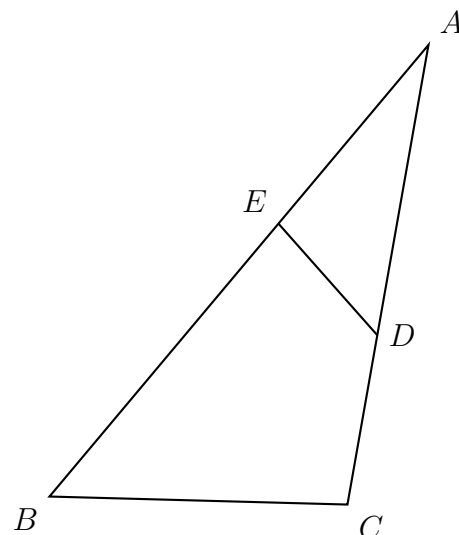
(b) What angle must be congruent to  $\angle B$  to prove  $\triangle ABP \sim \triangle JKP$  by *angle-angle similarity*?



3. The diagram below shows  $\triangle ABC$ , with  $\overline{AEB}$  and  $\overline{ADC}$ .

(a) Justify  $\angle BAC \cong \angle DAE$ .

(b) What angle must be congruent to  $\angle AED$  to prove  $\triangle ABC \sim \triangle ADE$  by *angle-angle similarity*?

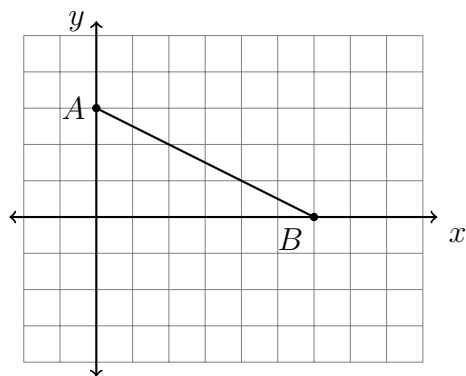


4. A dilation centered at the origin with scale factor  $k = \frac{4}{3}$  maps  $\overline{AB} \rightarrow \overline{A'B'}$ .

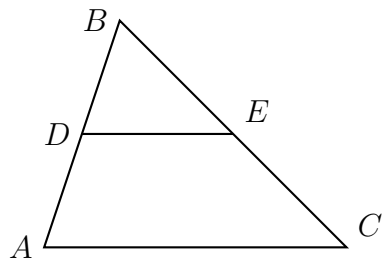
(a) Draw and label the image.

(b) What is the ratio of the length of  $\overline{A'B'}$  to  $\overline{AB}$ ?

(c) What is the relationship of the slope of  $\overline{A'B'}$  and  $\overline{AB}$ ?



5. Given  $\triangle ABC$ ,  $D$  is the midpoint of  $\overline{BA}$ ,  $E$  is a point on  $\overline{BC}$ , and  $\overline{DE}$  is drawn. If  $BD = 8$  and  $BE = 10$ , what is the length of  $\overline{BC}$  so that  $\overline{AC} \parallel \overline{DE}$ ?



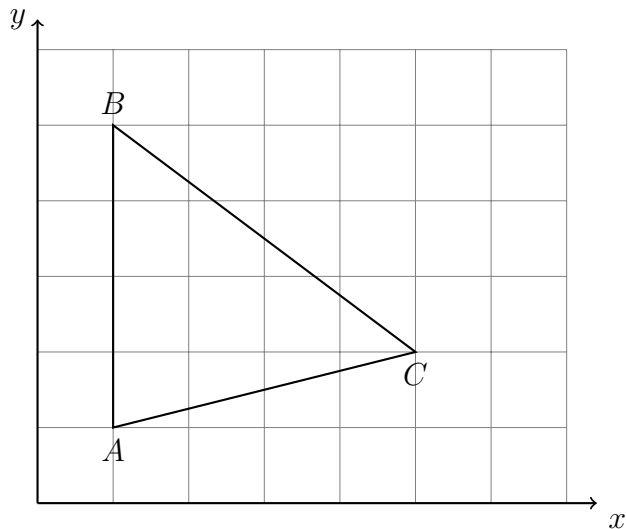
6. In diagram below, each centimeter represents six inches. Find the length of each side in feet. (measure with a metric scale)

(a)  $AB =$

(b)  $BC =$

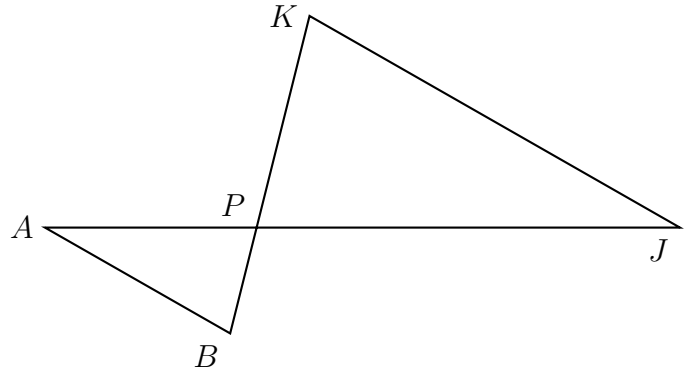
(c)  $AC =$

(d) Find the area of  $\triangle ABC$



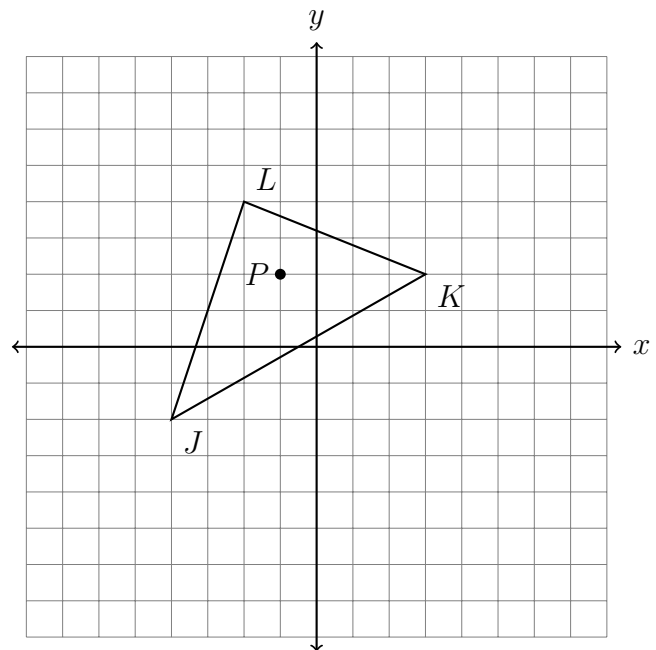
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7. Given  $\triangle ABP \sim \triangle JKP$  as shown below.  $AB = 10.0$ ,  $AP = 9.0$ ,  $BP = 5$ , and  $AJ = 27.0$ . Find  $JK$ .



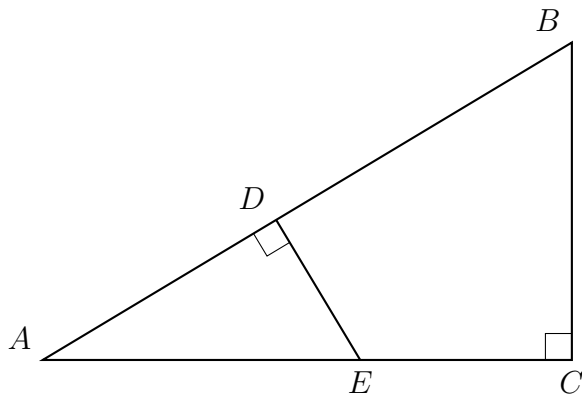
8. The vertices of  $\triangle JKL$  have the coordinates  $J(-4, -2)$ ,  $K(3, 2)$ , and  $L(-2, 4)$ , as shown.

Apply a dilation to  $\triangle JKL \rightarrow \triangle J'K'L'$ , centered at  $P(-1, 2)$  and with a scale factor  $k = 2$ . Draw the image  $\triangle J'K'L'$  on the set of axes below, labeling the vertices.



What is the ratio of the area of  $\triangle JKL$  to  $\triangle J'K'L'$ ?

9. In  $\triangle ABC$  shown below,  $\angle ACB$  is a right angle,  $E$  is a point on  $\overline{AC}$ , and  $\overline{ED}$  is drawn perpendicular to hypotenuse  $\overline{AB}$ .



If  $AB = 9$ ,  $BC = 6$ , and  $DE = 4$ , what is the length of  $\overline{AE}$ ?

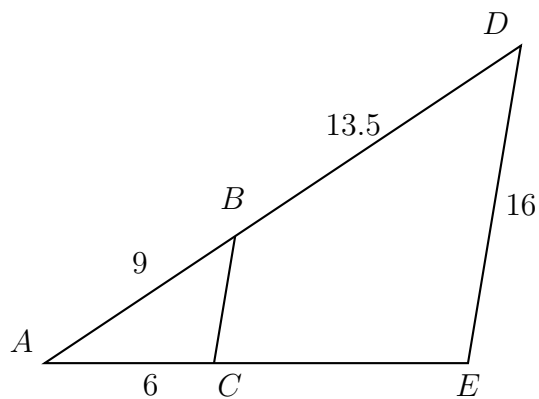
10. In the diagram below,  $\angle ABC \cong \angle ADE$ ,  $AB = 9$ ,  $AC = 6$ ,  $BD = 13.5$ , and  $DE = 16$ . Find  $AD$  and the scale factor  $k$ . Then find  $AE$  and  $BC$ .

(a)  $AD =$

(b)  $k =$

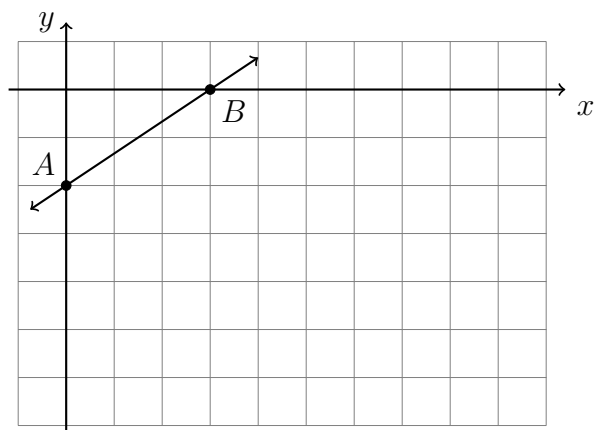
(c)  $AE =$

(d)  $BC =$



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

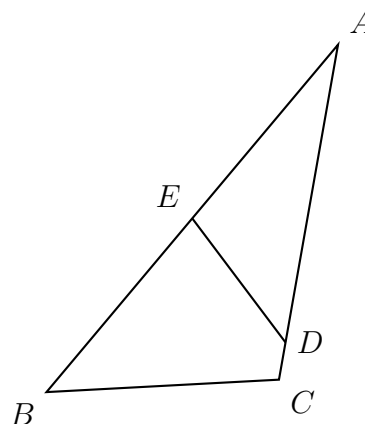


12. The diagram below shows  $\triangle ABC$ .  $E$  bisects  $\overline{AB}$ , and  $\angle ACB \cong \angle AED$ .  $AB = 18$ ,  $AC = 12$ , and  $DE = 7$ . Find the scale factor  $k$ ,  $BC$ , and  $AD$ .

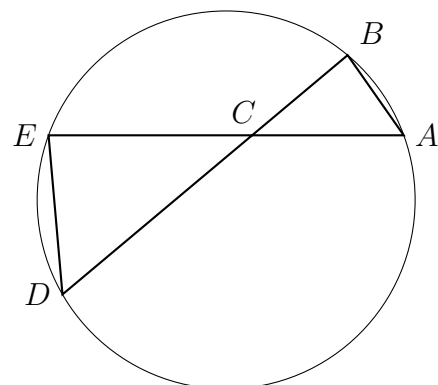
(a)  $k =$

(b)  $BC =$

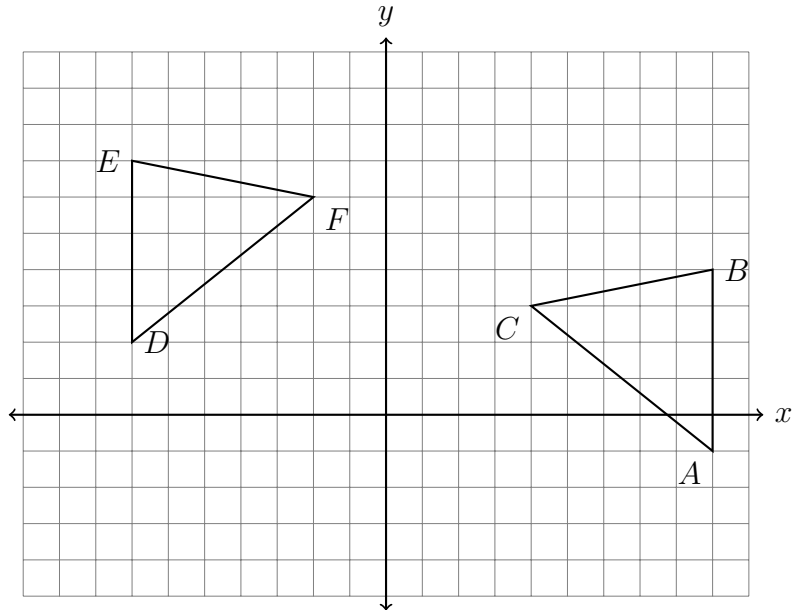
(c)  $AD =$



13. In the diagram below, the chords  $\overline{AE}$  and  $\overline{BD}$  intersect at  $C$ . Given  $\triangle ABC \sim \triangle DEC$ ,  $BC = 6$ ,  $CD = 12$ , and  $CE = 10$ . Determine the length of  $\overline{CA}$ .



14. What transformation or series of transformations map  $\triangle ABC$  onto  $\triangle DEF$ , shown below? Fully specify the transformation(s).



15. Reflect  $\triangle ABC$  over the  $y$ -axis then dilate the resulting triangle by a factor of 2 centered at the origin.

