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9.9 Classwork: Similarity ratios, dilation, transformations, symmetry

I can solve problems using similarity criteria.

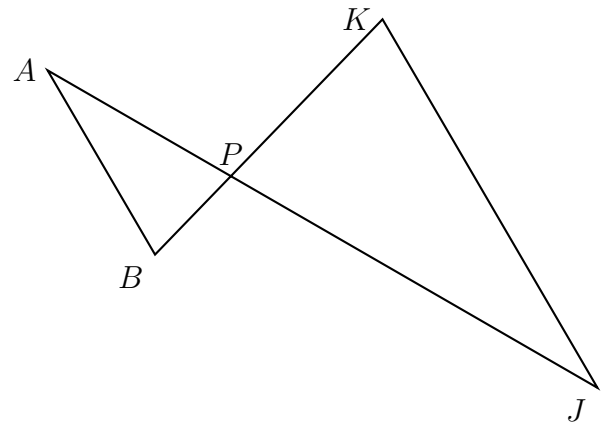
CCSS.HSG.SRT.B.5

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 $\angle APB \cong \angle JPK$.

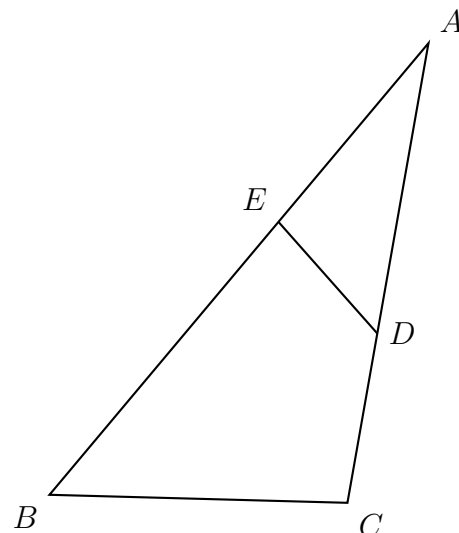
(b) What angle must be congruent to $\angle B$ to prove $\triangle ABP \sim \triangle JKP$ by *angle-angle similarity*?



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*?

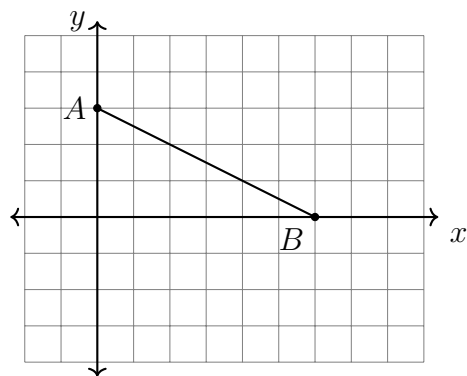


4. A dilation centered at the origin with scale factor $k = \frac{4}{3}$ maps $\overline{AB} \rightarrow \overline{A'B'}$.

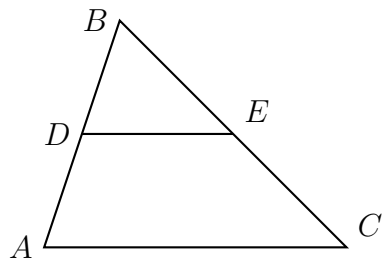
(a) Draw and label the image.

(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 $\overline{AC} \parallel \overline{DE}$?



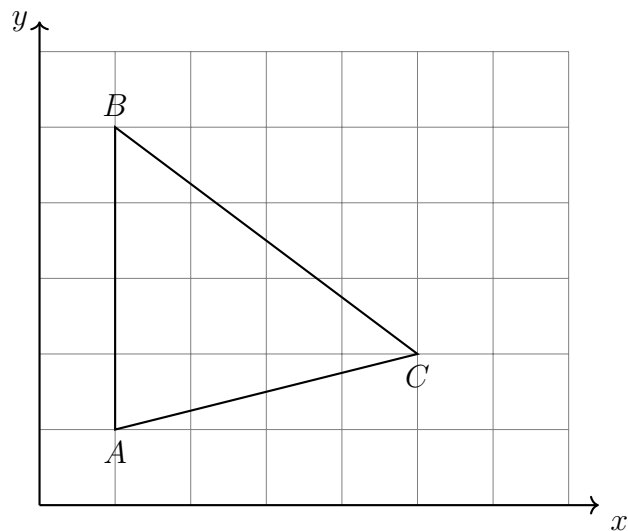
6. In diagram below, each centimeter represents six inches. Find the length of each side in feet. (measure with a metric scale)

(a) $AB =$

(b) $BC =$

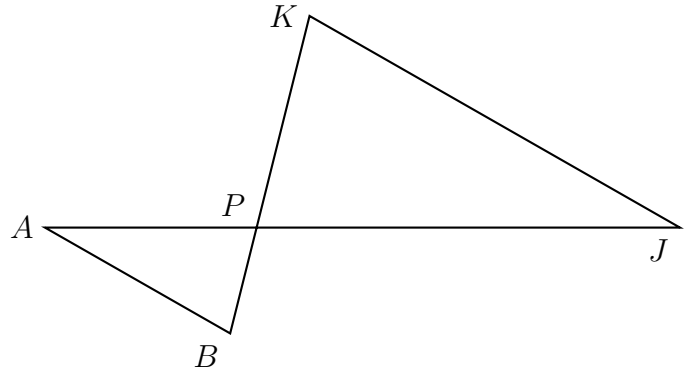
(c) $AC =$

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



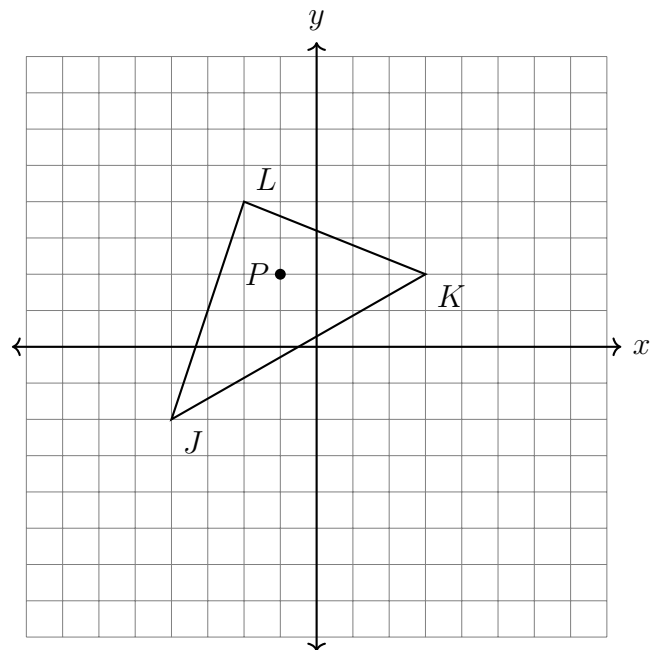
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7. Given $\triangle ABP \sim \triangle JKP$ as shown below. $AB = 10.0$, $AP = 9.0$, $BP = 5$, and $AJ = 27.0$. Find JK .



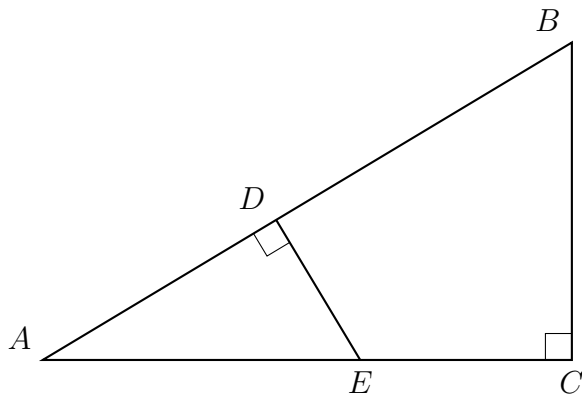
8. The vertices of $\triangle JKL$ have the coordinates $J(-4, -2)$, $K(3, 2)$, and $L(-2, 4)$, as shown.

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} ?

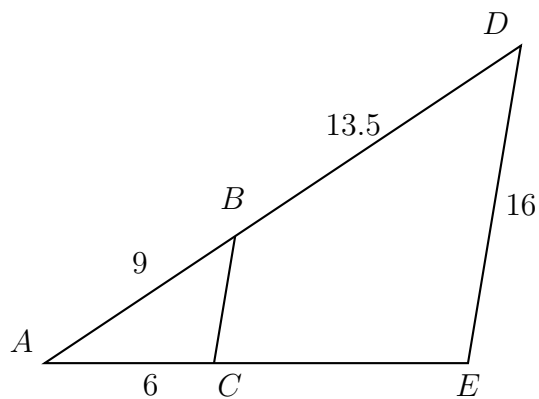
10. In the diagram below, $\angle ABC \cong \angle ADE$, $AB = 9$, $AC = 6$, $BD = 13.5$, and $DE = 16$. Find AD and the scale factor k . Then find AE and BC .

(a) $AD =$

(b) $k =$

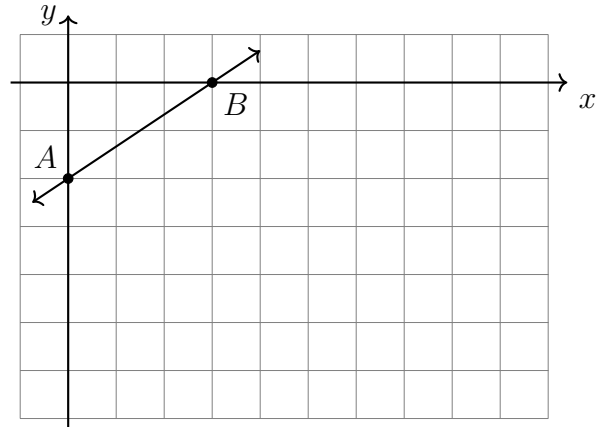
(c) $AE =$

(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 $\overleftrightarrow{A'B'}$.

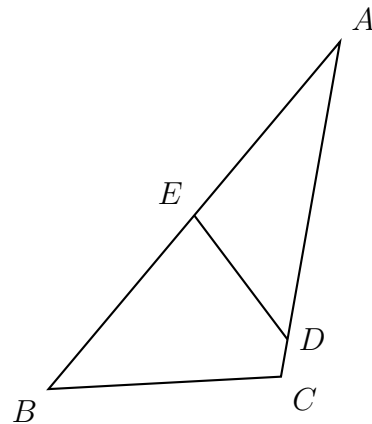


12. The diagram below shows $\triangle ABC$. E bisects \overline{AB} , and $\angle ACB \cong \angle AED$. $AB = 18$, $AC = 12$, and $DE = 7$. Find the scale factor k , BC , and AD .

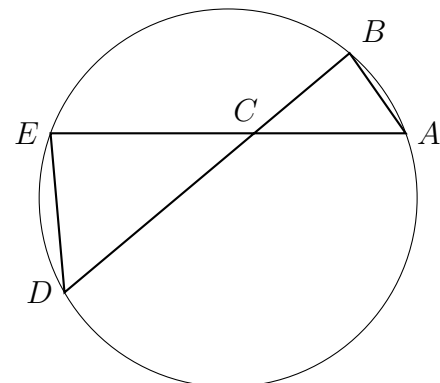
(a) $k =$

(b) $BC =$

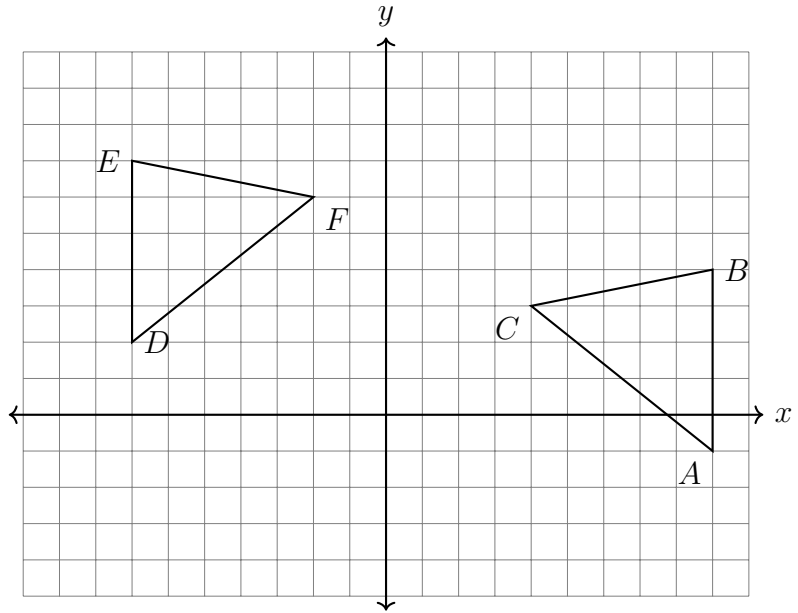
(c) $AD =$



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.

