

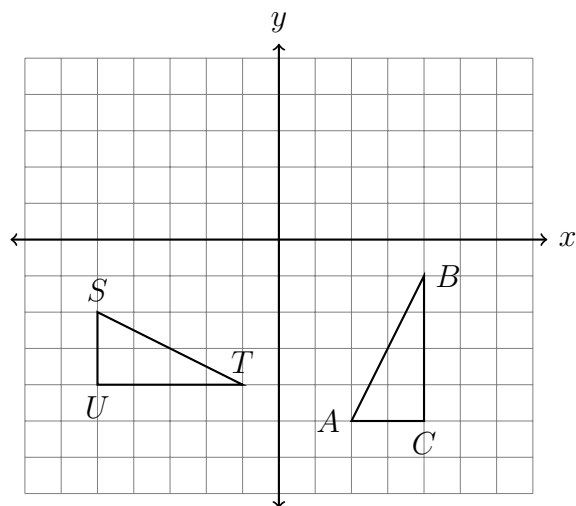
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9.9 Exam: Congruence and similarity transformations, compositions

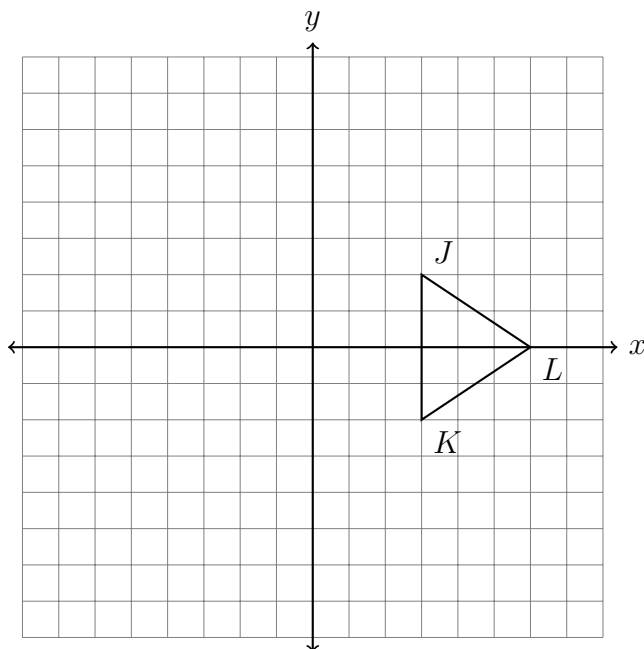
1. State the translation that would map $M(-2, 9)$ onto $M'(-1, 8)$.

2. On the set of axes below, $\triangle ABC \cong \triangle STU$.

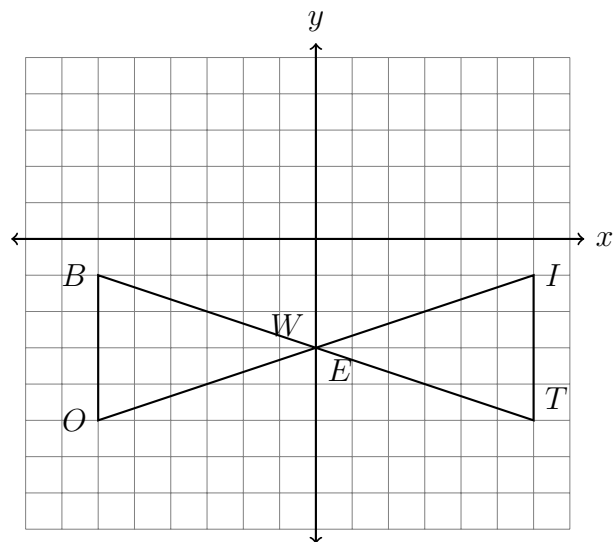
Describe the rigid motion that maps $\triangle ABC$ onto $\triangle STU$.



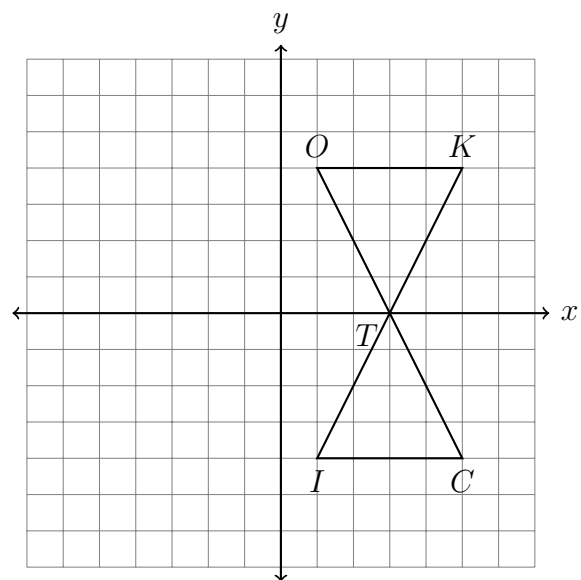
3. Rotate $\triangle JKL$ 90° clockwise around the origin on the axes below, labeling the image $\triangle J'K'L'$.



4. Determine and state the transformation mapping $\triangle BOW$ onto $\triangle TIE$.



5. Describe a rigid motion that maps $\triangle TIC$ onto $\triangle TOK$.



6. Find the coordinates of the image of the point $D(3, 5)$ after a reflection across the x -axis.

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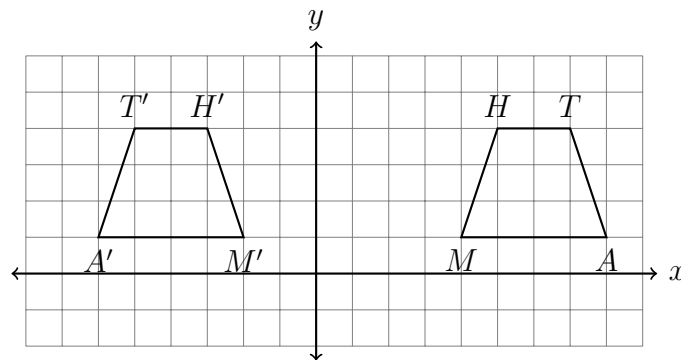
7. The quadrilateral $MATH$ is mapped to $M'A'T'H'$ by a rigid motion. What transformation has been applied?

(a) Dilation

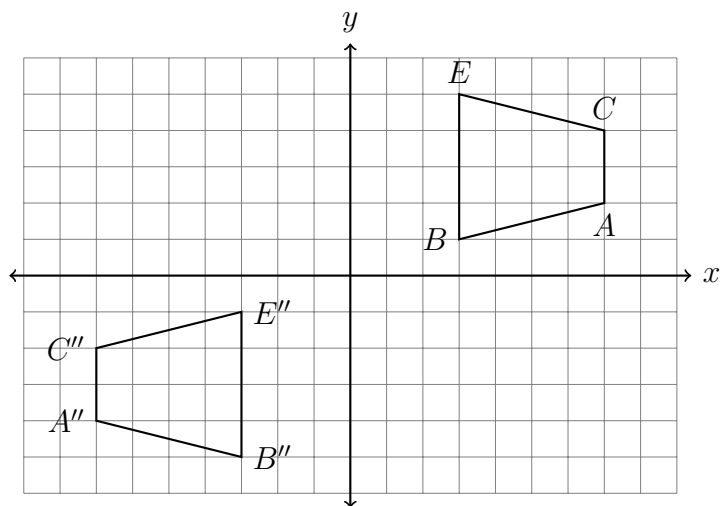
(b) Reflection

(c) Rotation

(d) Translation



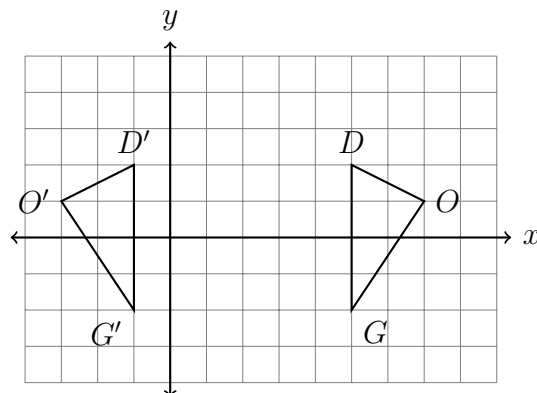
8. Determine and state the sequence of transformations applied to map $BECA$ to $B''E''C''A''$.



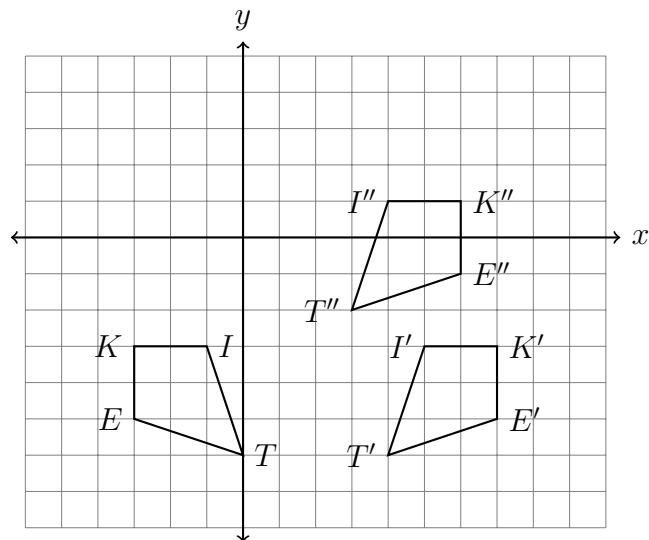
9. Which of the following would map $\triangle DOG \rightarrow \triangle D'O'G'$?

T F $(x, y) \rightarrow (x - 6, y + 0)$ T F Rotated 90° clockwise around $(2, 0)$ T F Reflected across the y -axis

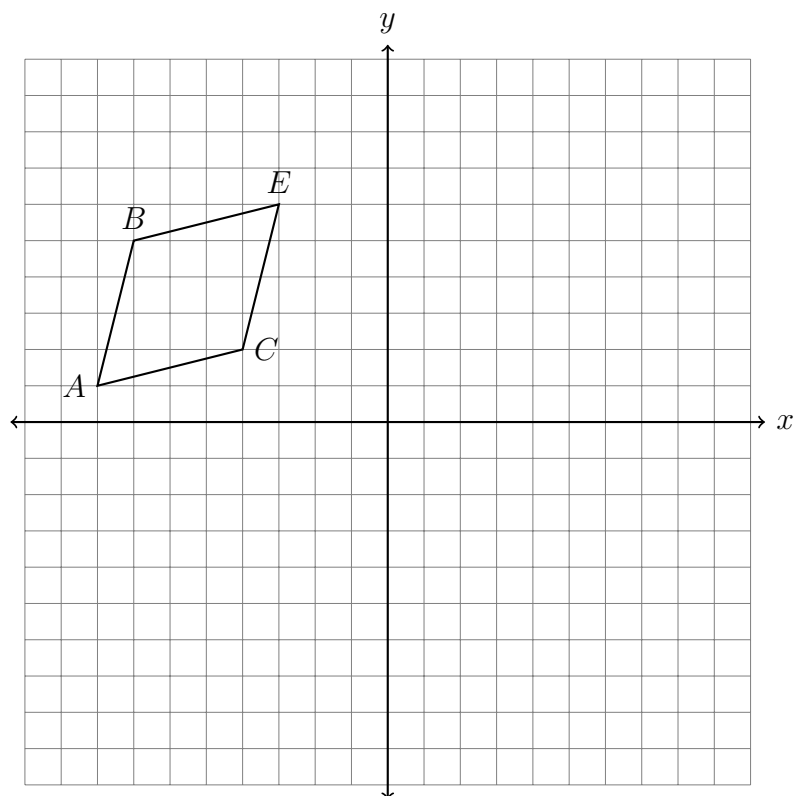
T F Translated six to the left, down zero

T F Slid to the left four, then reflected across the y -axisT F Reflected across the line $x = 2$ 

10. The quadrilateral $KITE$ undergoes rigid motions, shown below. Describe the sequence of transformations applied.



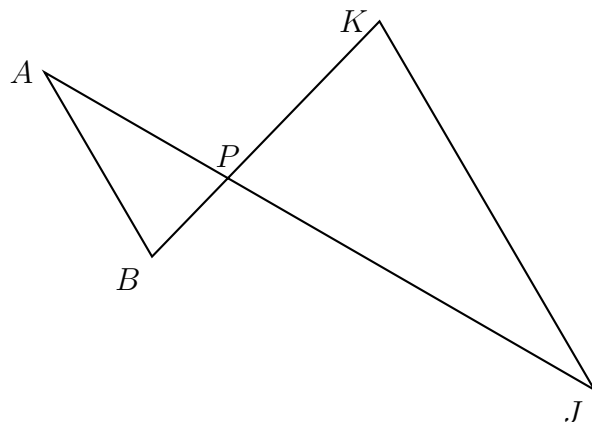
11. Reflect the rhombus $BECA$ across the x -axis, then translated $(x, y) \rightarrow (x + 4, y + 2)$. Label the images $B'E'C'A'$ and $B''E''C''A''$.



12. 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 $\angle K$ to prove $\triangle ABP \sim \triangle JKP$ by *angle-angle similarity*?

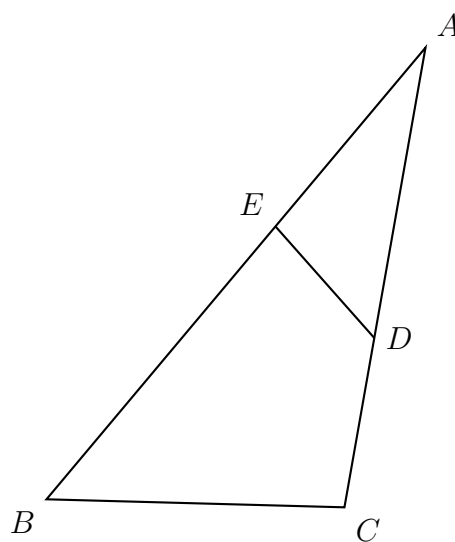


13. Given $\triangle PQR \sim \triangle STU$, $m\angle P = 37^\circ$, and $m\angle T = 46^\circ$. Find $m\angle R$.

14. 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 $\angle ABC$ to prove $\triangle ABC \sim \triangle ADE$ by *angle-angle similarity*?

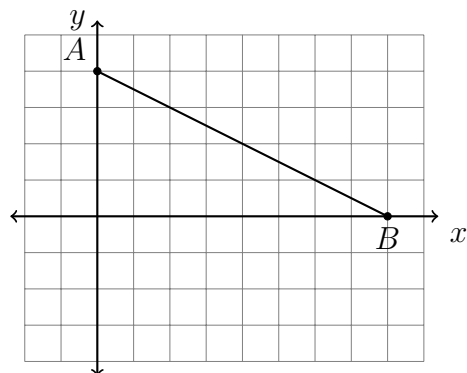


15. A dilation centered at the origin with scale factor $k = \frac{1}{2}$ maps $\overline{AB} \rightarrow \overline{A'B'}$.

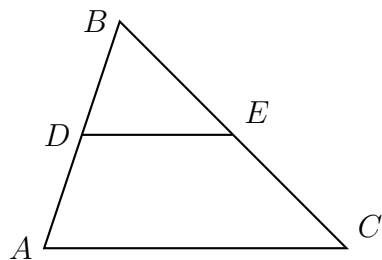
(a) Draw and label the image.

(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} ?



16. Given $\triangle ABC$, D is the midpoint of \overline{BA} , E is a point on \overline{BC} , and \overline{DE} is drawn. If $BA = 8$ and $BE = 6$, what is the length of \overline{BC} so that $\overline{AC} \parallel \overline{DE}$?



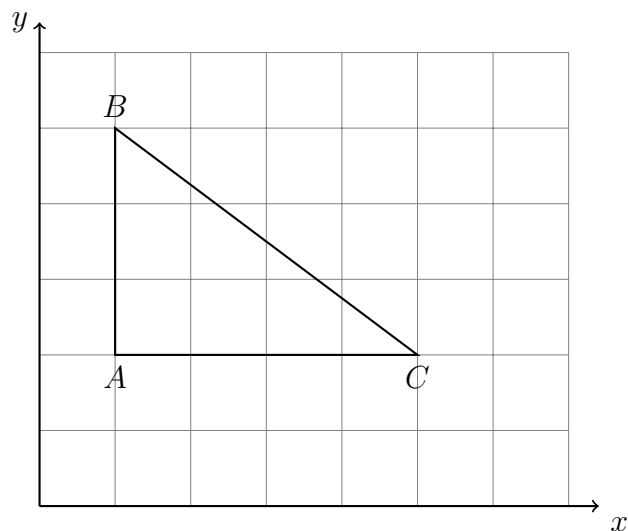
17. In diagram below, each centimeter represents six inches. Find the value of each item below in feet.

(a) $AC =$

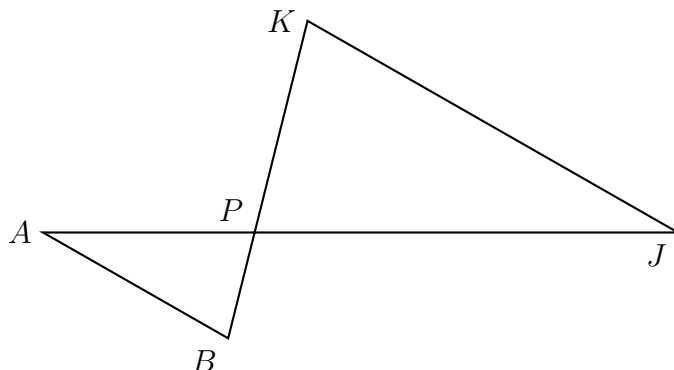
(b) $BC =$

(c) Find the perimeter of $\triangle ABC$

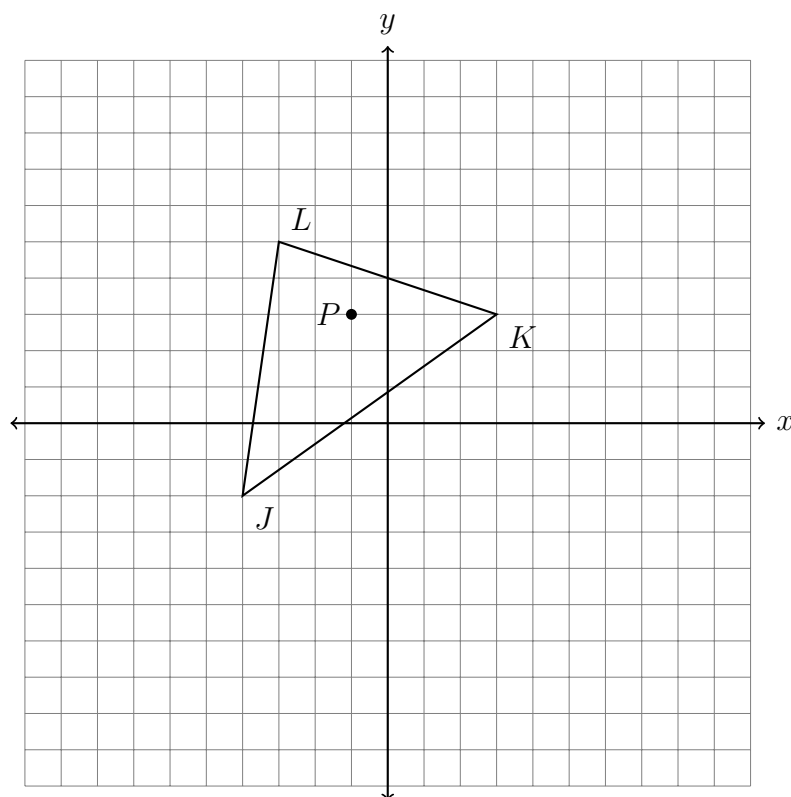
(d) Find the area of $\triangle ABC$



18. Given $\triangle ABP \sim \triangle JKP$ as shown below. $AB = 9.0$, $AP = 10.0$, $BP = 5.5$, and $AJ = 25.0$. Find JK .

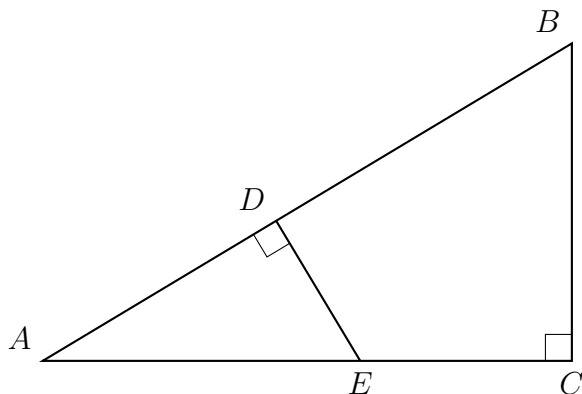


19. The vertices of $\triangle JKL$ have coordinates $J(-4, -2)$, $K(3, 3)$, and $L(-3, 5)$, as shown. Apply a dilation to $\triangle JKL \rightarrow \triangle J'K'L'$, centered at $P(-1, 3)$ and with a scale factor $k = 2$. Draw the image $\triangle J'K'L'$ on the set of axes below, labeling the vertices.



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

20. 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} ?

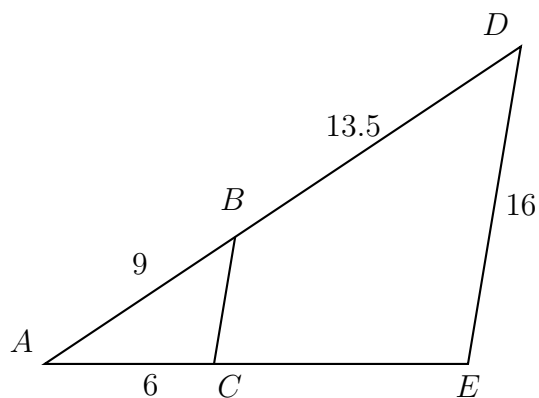
21. In the diagram below, $\angle ABC \cong \angle ADE$, $AB = 9$, $AC = 6$, $BD = 13.5$, and $DE = 16$. Find AD and the scale factor k . Then find AE and BC .

(a) $AD =$

(b) $k =$

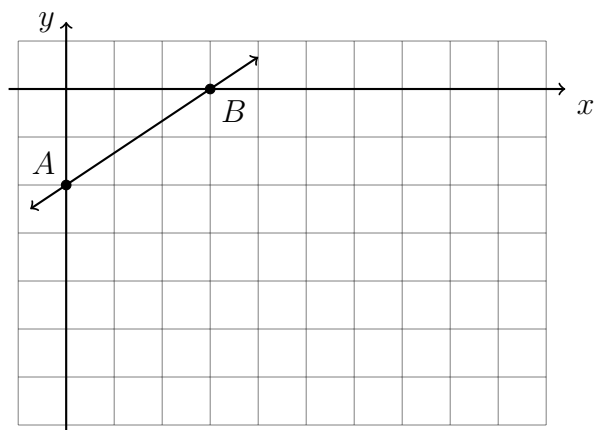
(c) $AE =$

(d) $BC =$

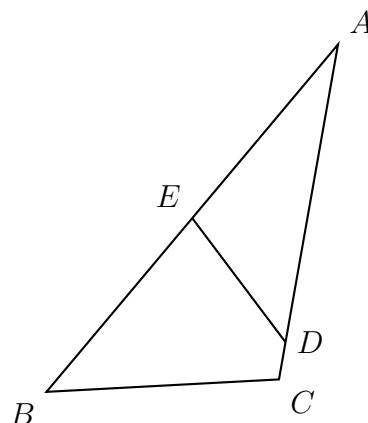


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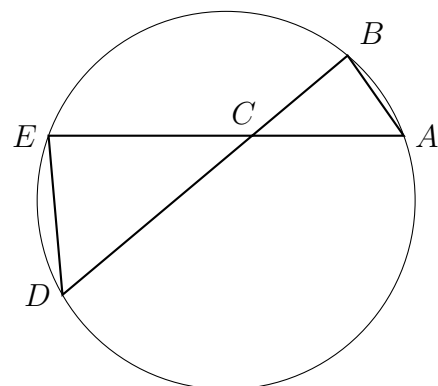
22. The line \overleftrightarrow{AB} has the equation $y = \frac{2}{3}x - 2$. Apply a dilation mapping $\overleftrightarrow{AB} \rightarrow \overleftrightarrow{A'B'}$ with a factor of $k = 3$ centered at the origin. Draw and label the image on the grid. Write the equation of the line $\overleftrightarrow{A'B'}$.



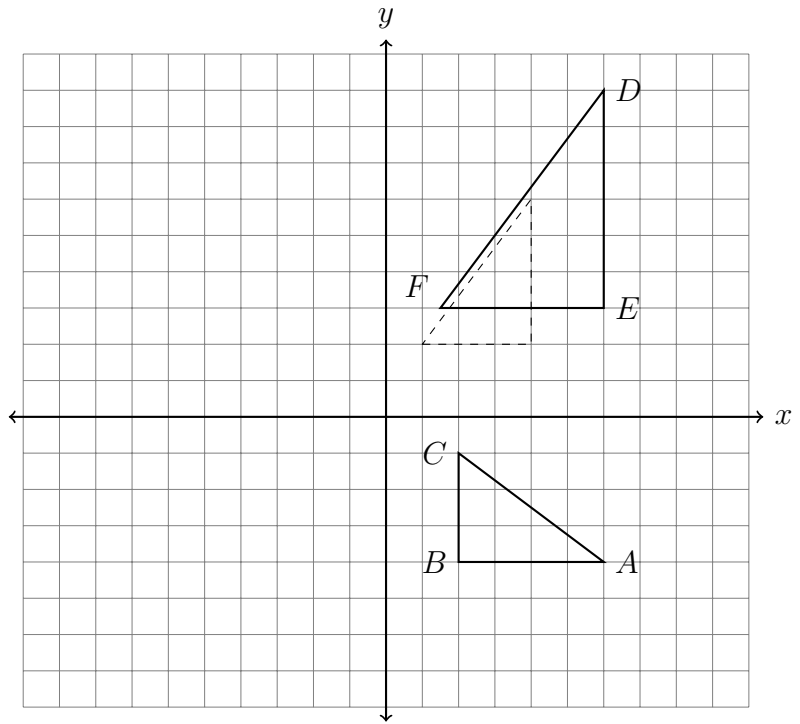
23. The diagram below shows $\triangle ABC$. E bisects \overline{AB} , and $\angle ACB \cong \angle AED$. $AB = 18$, $AC = 12$, and $DE = 7$. Find the scale factor k , BC , and AD .

(a) $k =$ (b) $BC =$ (c) $AD =$ 

24. 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} .



25. Determine and state the sequence of transformations applied to map $\triangle ABC \rightarrow \triangle DEF$.



26. What sequence of transformations would map $\triangle ABC$ onto $\triangle DEF$?

