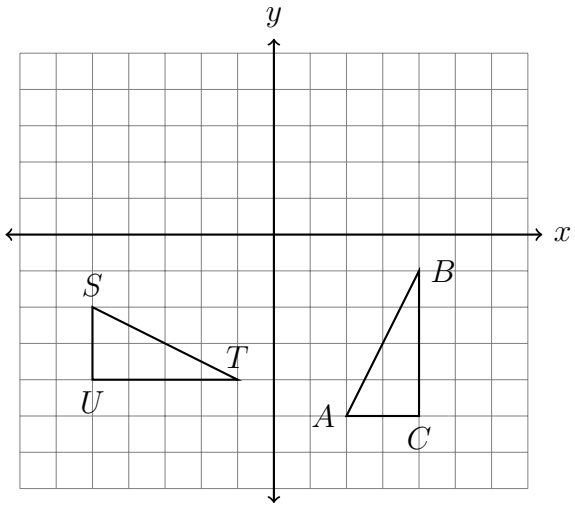
9.9b Exam: Congruence and similarity transformations, compositions

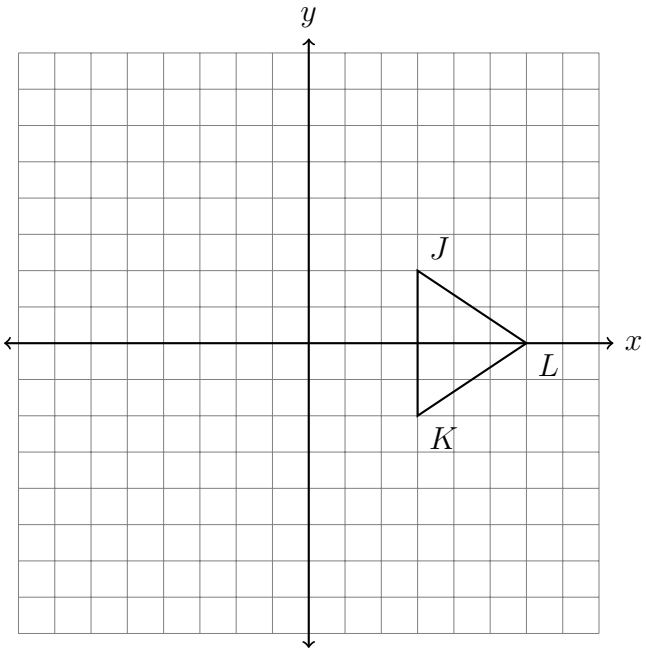
1. State the translation that would map $M(-2, 9)$ onto $M'(-1, 8)$.

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 $\triangle J'K'L'$.



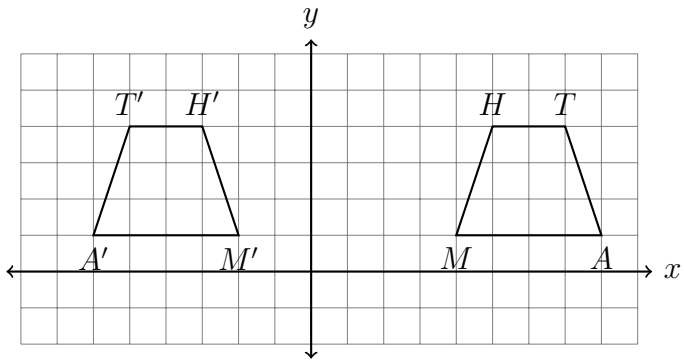
4. The quadrilateral $MATH$ is mapped to $M'A'T'H'$ by a rigid motion. What transformation a been applied?

   (a) Dilation

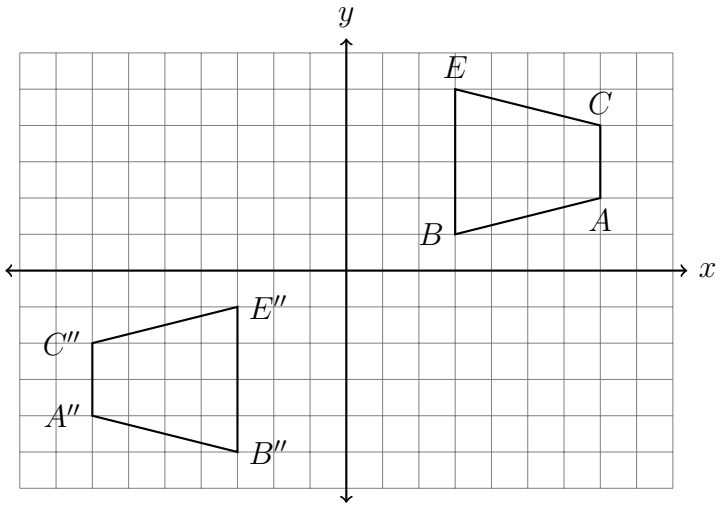
   (b) Reflection

   (c) Rotation

   (d) Translation



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



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

T F $(x, y) \to (x - 6, y + 0)$

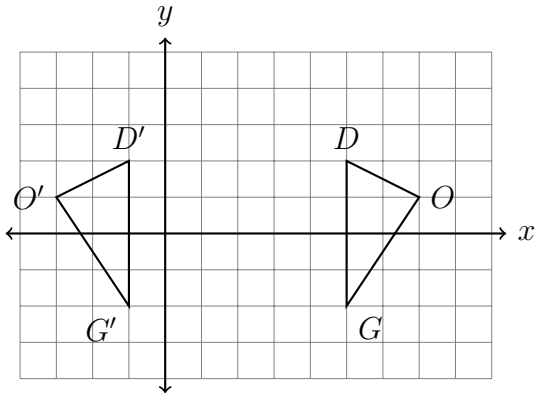
T F Rotated 90° clockwise around $(2, 0)$

T F Reflected across the y-axis

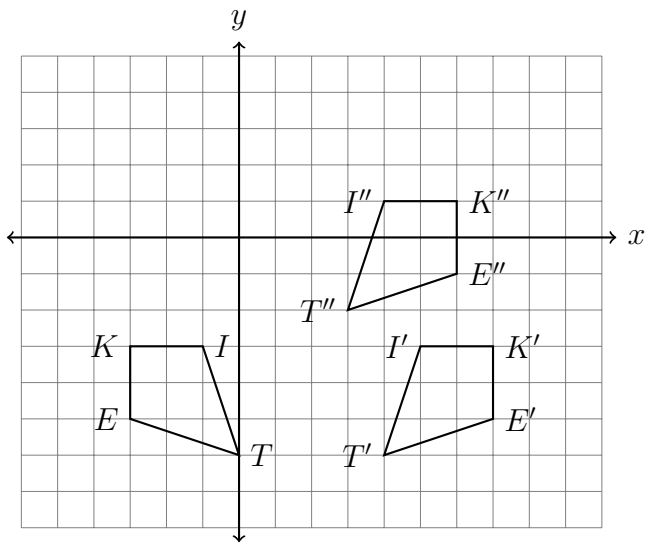
T F Translated six to the left, down zero

T F Slid to the left four, then reflected across the y-axis

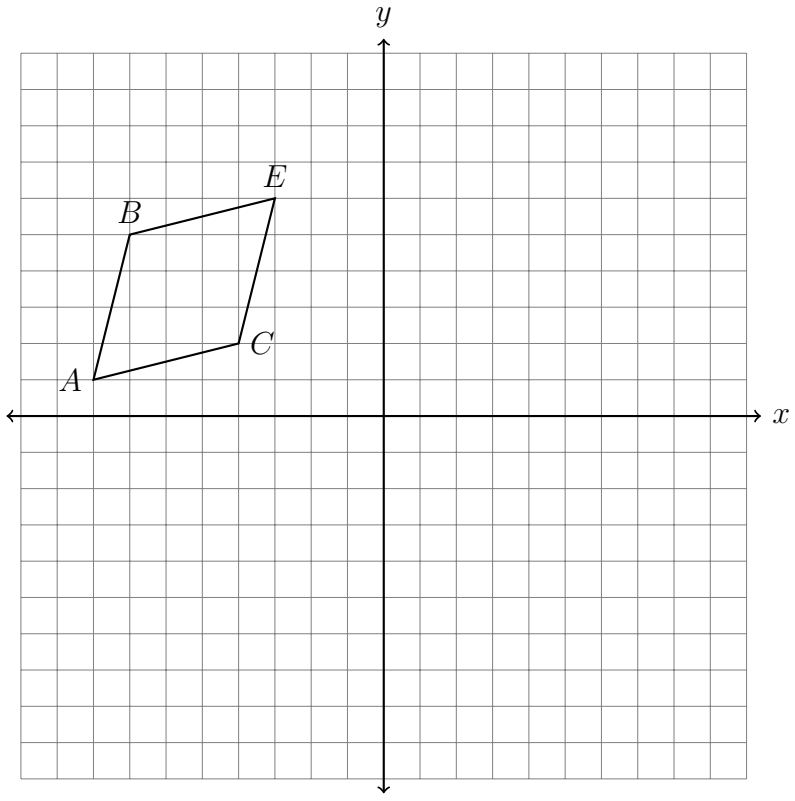
T F Reflected across the line $x = 2$



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



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



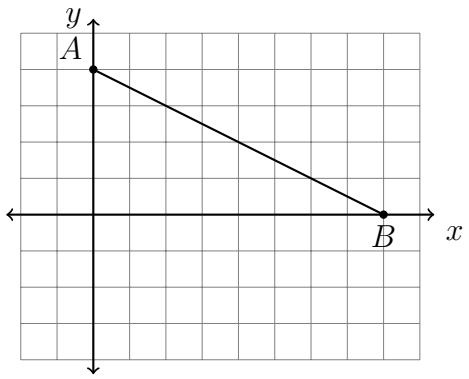
9. Given $\triangle PQR \sim \triangle STU$, $m\angle P = 37°$, and $m\angle T = 46°$. Find $m\angle R$.

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

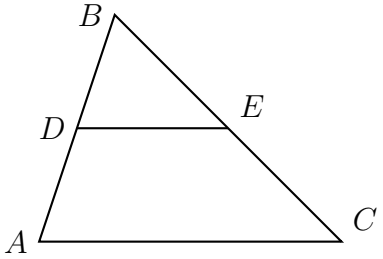
    (a) Draw and label the image.

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

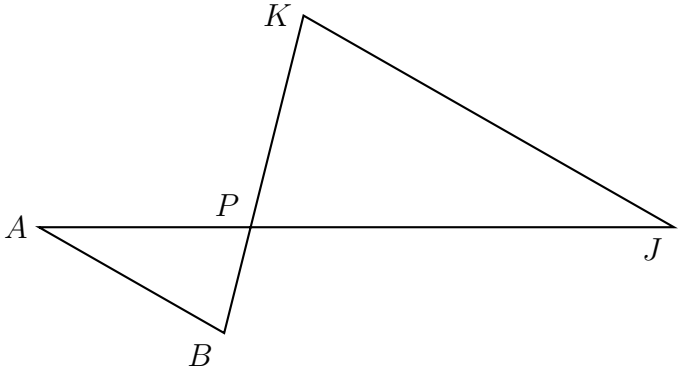
    (c) What is the relationship of the slope of $\overline{A'B'}$ and $\overline{AB}$?



11. 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 $\overline{AC} \parallel \overline{DE}$?



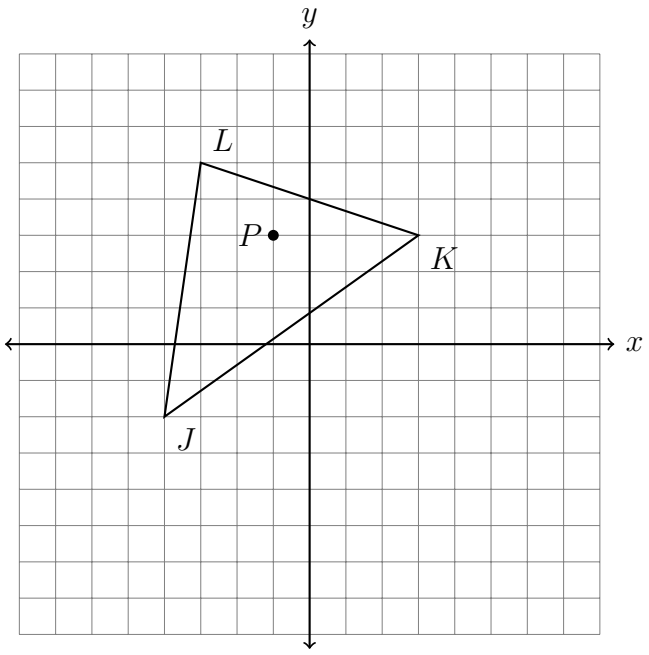
12. Given $\triangle ABP \sim \triangle JKP$ as shown below. $AB = 9.0$, $AP = 10.0$, $BP = 5.5$, and $AJ = 25.0$. Find JK.



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

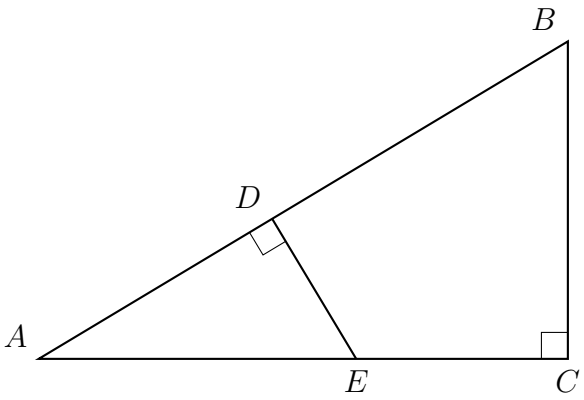
14. The vertices of $\triangle JKL$ have the coordinates $J(-4, -2)$, $K(3, 3)$, and $L(-3, 5)$, as shown.

    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, and make a table showing the correspondence of both triangles' coordinate pairs.



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

15. 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 hypontenuse $\overline{AB}$.



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

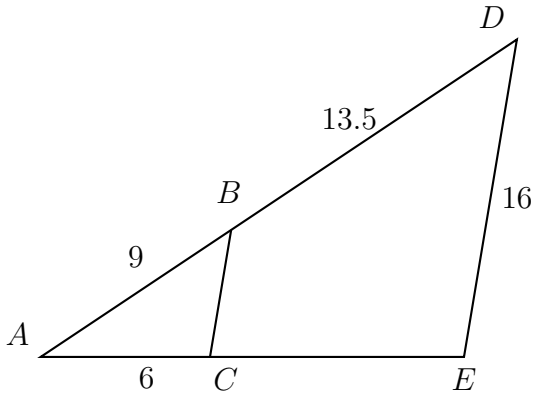
16. In the diagram below, $\angle ABC \cong \angle ADE$, $AB = 9$, $AC = 6$, $BD = 13.5$, and $DE = 16$. Find AD and the scale factor k. Then find AE and BC.

(a) $AD =$

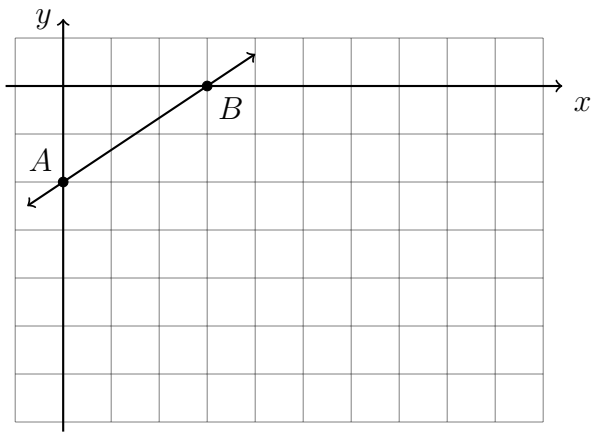
(b) $k =$

(c) $AE =$

(d) $BC =$



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

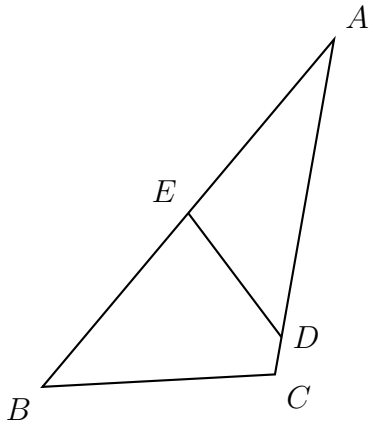


18. The diagram below shows $\triangle ABC$. E bisects $\overline{AB}$, and $\angle ACB \cong \angle AED$. $AB = 18$, $AC = 12$, and $DE = 7$. Find the scale factor k, BC, and AD.

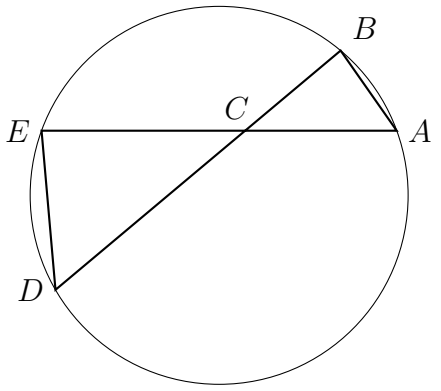
(a) $k =$

(b) $BC =$

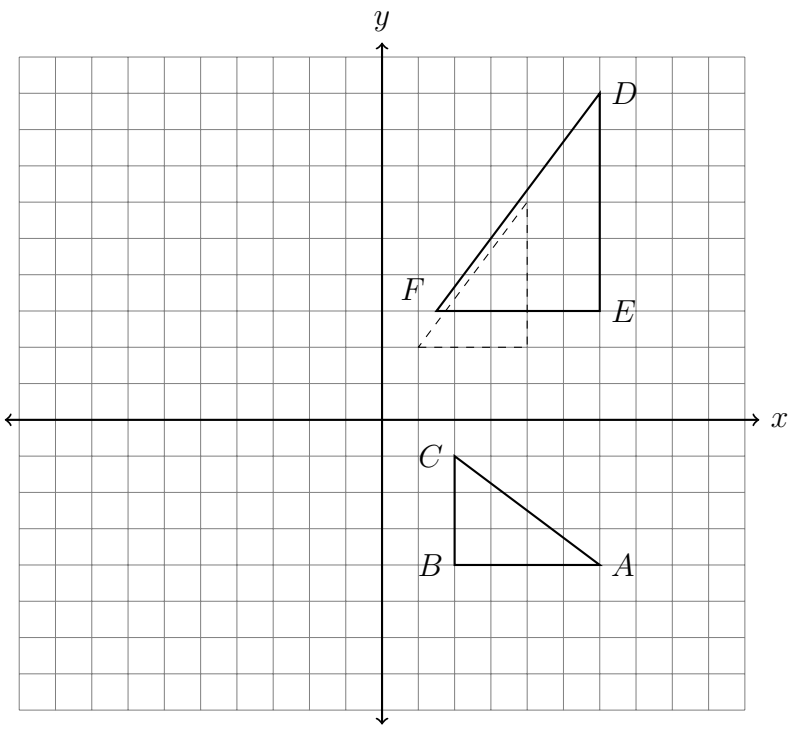
(c) $AD =$



19. 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 $\overline{CA}$.



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



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