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7.12 Similarity transformations **CCSS.HSG.SRT.B.5**

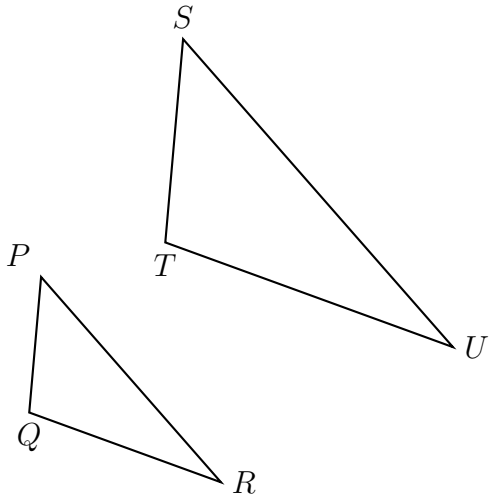
1. A dilation maps triangle PQR onto triangle STU with $QR = 7$ and $TU = 14$.

   (a) $\overline{PR} \rightarrow$ _____

   (b) What scale factor maps $\triangle PQR \rightarrow \triangle STU$?

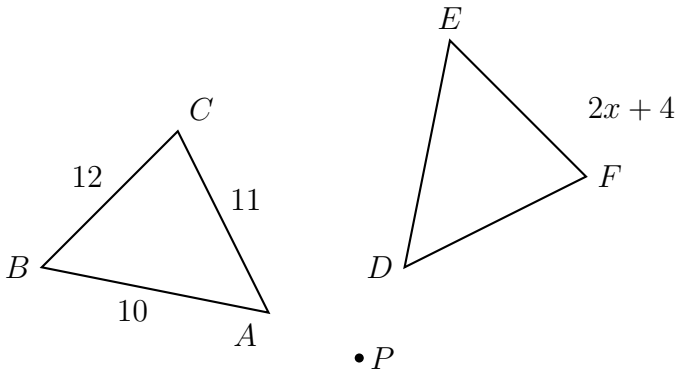
   (c) Given $PR = 10$, find SU.

   (d) Given $ST = 6$, find PQ.



2. After a dilation with center $(0, 0)$, the image of $\overline{MN}$ is $\overline{M'N'}$. If $MN = 7.2$ and $M'N' = 36$, find the scale factor of this dilation.

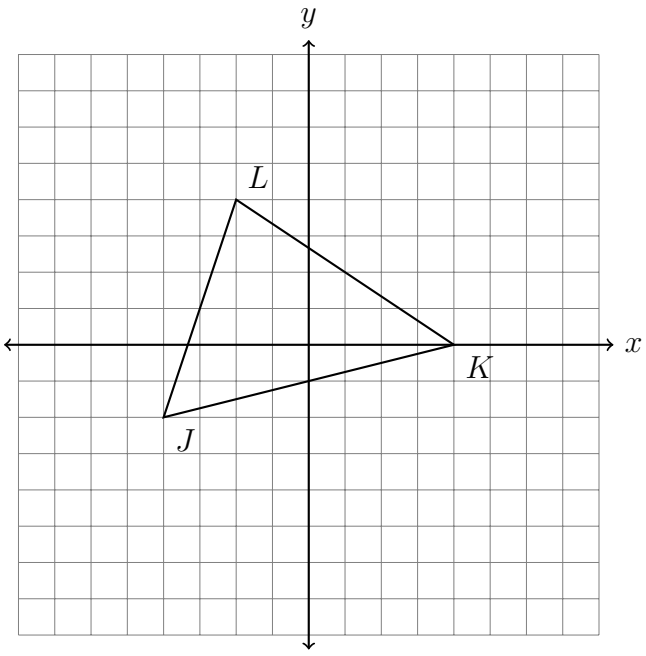
3. In the diagram below, $\triangle ABC$ with sides of 10, 12, and 11, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point P.



   If $EF = 2x + 4$, what is the value of x?

4. The vertices of $\triangle JKL$ have the coordinates $J(-4,-2)$, $K(4,0)$, and $L(-2,4)$, as shown.

   Apply a dilation to $\triangle JKL \rightarrow \triangle J'K'L'$, centered on the origin and with a scale factor $k = 1.5$. 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.



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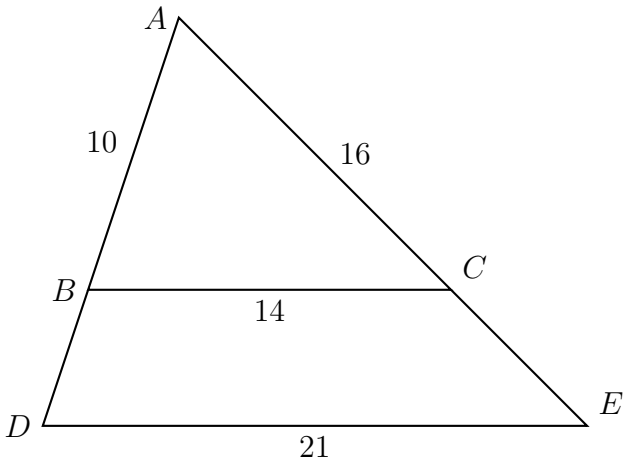
5. Triangle ABC is dilated with a scale factor of k centered at A, yielding $\triangle ADE$, as shown. Given $AB = 10$, $BC = 14$, $AC = 16$, and $DE = 21$.

   Find BD, AE, and k (the scale factor).



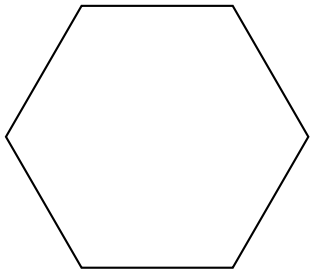
6. Circle YES or NO to indicate whether the given transformation maps the hexagon onto itself.

   (a) Yes No A rotation of 120° counterclockwise around point D.

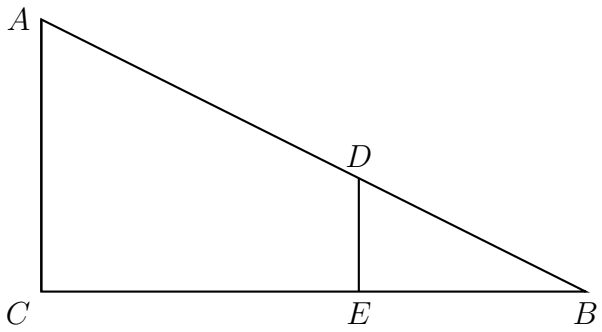
   (b) Yes No A reflection over $\overleftrightarrow{AE}$

   (c) Yes No A reflection over a line through the midpoints of $\overline{BC}$ and $\overline{EF}$.

   (d) Yes No A rotation of 60° clockwise around the hexagon's center.

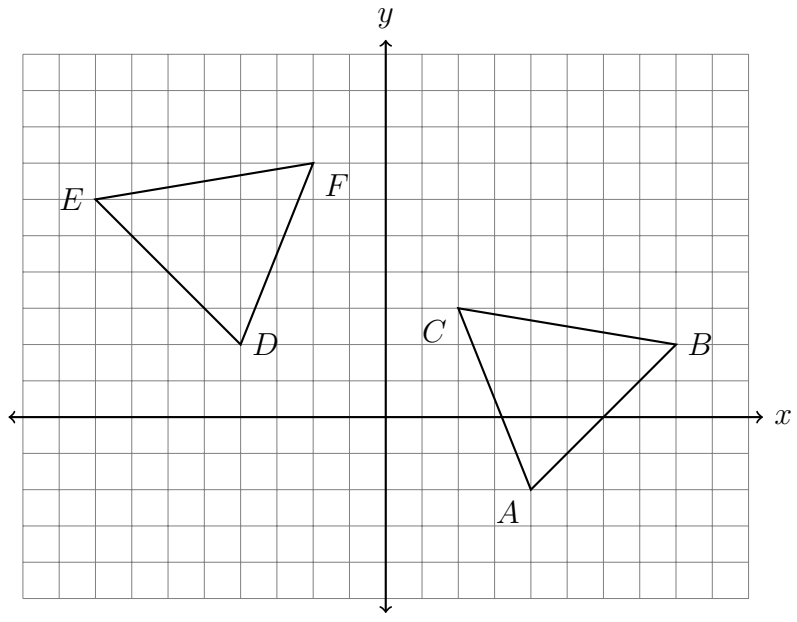


7. In right triangle ABC shown below, point D is on $\overline{AB}$ and point E is on $\overline{BC}$ such that $\overline{AC} \parallel \overline{DE}$



If $AB = 20$, $BC = 15$, and $AD = 12$, what is the length of $\overline{BE}$?

8. What series of transformations map $\triangle ABC$ onto $\triangle DEF$, shown below? Fully specify the transformations.



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9. What is the length of the segment $A(-2, 1)$, $B(3, 13)$?

10. What is the equation of a line through the point $A(5, -1)$ and parallel to the line $y = \frac{2}{3}x - 2$? (hint: use the point-slope formula, $y - y_A = m(x - x_A)$)

11. The line l has the equation $y = -\frac{3}{5}x + 4$. To each line below, circle whether l is parallel, perpendicular, or neither.

    (a) parallel perpendicular neither $y = \frac{3}{5}x - 2$

    (b) parallel perpendicular neither $y = \frac{5}{3}x + 9$

    (c) parallel perpendicular neither $3x - 5y = -15$

    (d) parallel perpendicular neither $5x - 3y = 6$

12. Simplify each expression. (Leave it in radical form if necessary, not a decimal.)

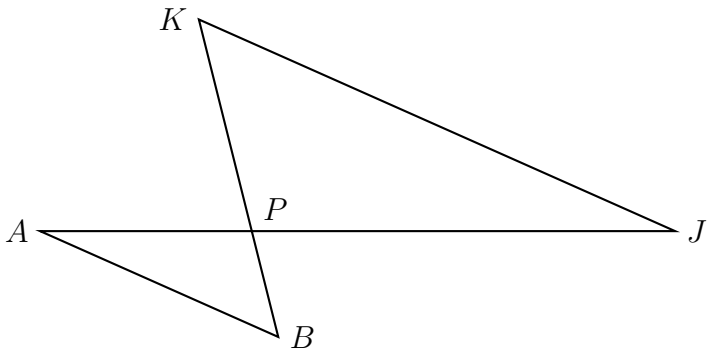
    (a) $\sqrt{20}$

    (b) $\sqrt{75}$

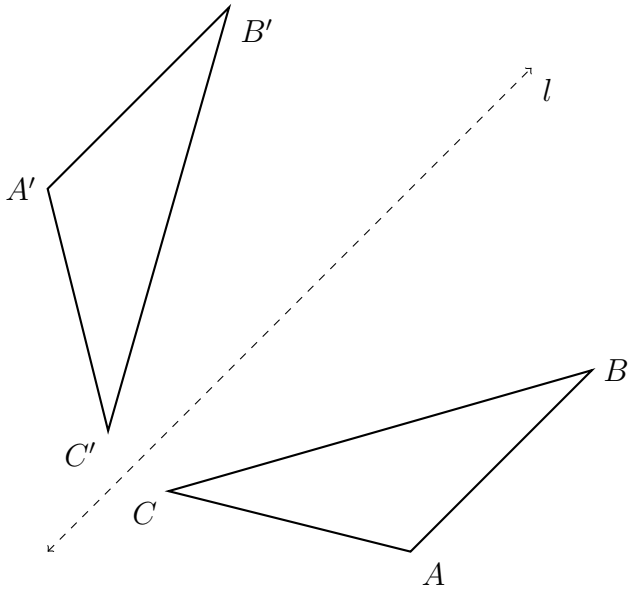
    (c) $\sqrt{300}$

    (d) $\sqrt{\frac{36}{49}}$

13. Given $\triangle ABP$ and $\triangle JKP$ as shown below. $\overline{AB} \parallel \overline{JK}$. $AP = 5$, $JP = 12$, and $JK = 18$. Find AB.



14. The $\triangle ABC$ is reflected across l to yield $\triangle A'B'C'$. $AB = 3x + 4$, $A'B' = 5x - 10$, and $BC = 4x + 12$. Find the length $B'C'$.



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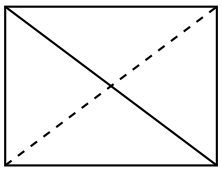
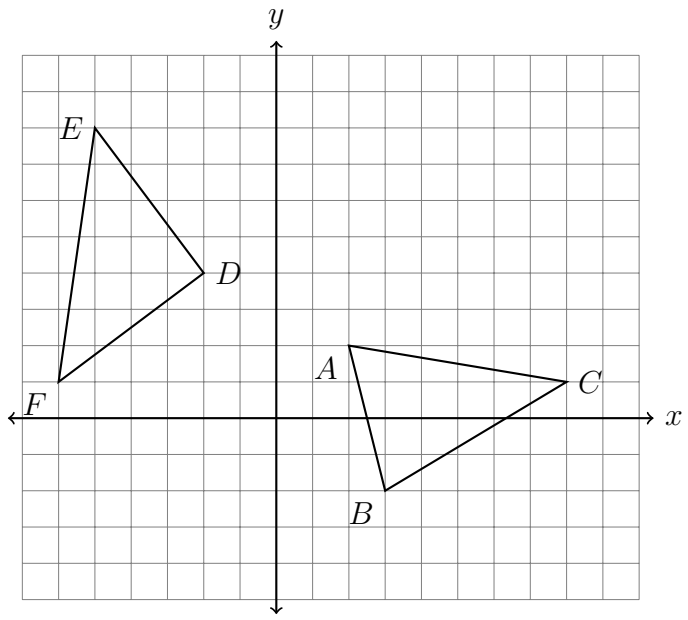
15. The figure shows a rectangle (not a square).



Which transformations carries the rectangle onto itself? Mark each True or False.

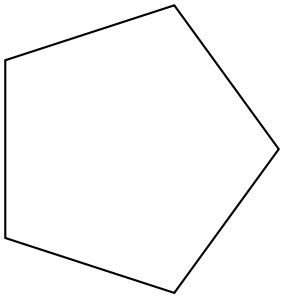
(a)	A reflection over the solid diagonal	True	False
(b)	A reflection over the dashed diagonal	True	False
(c)	A clockwise rotation of 90° about the intersection of the diagonals	True	False
(d)	A clockwise rotation of 180° about the intersection of the diagonals	True	False

16. The grid shows $\triangle ABC$ and $\triangle DEF$.



Let $\triangle A'B'C'$ be the image of $\triangle ABC$ after a rotation about point A. Determine and state the location of B' if the location of point C' is $(3, 8)$. Explain your answer, supported by stating the transformation applied.

17. What is the smallest non-zero angle of rotation about its center that would map the pentagon onto itself?

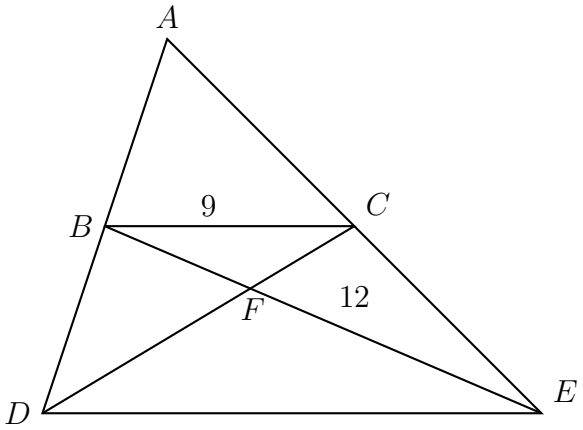


18. Triangle ADE and its midline $\overline{BC}$ are drawn, with B the midpoint of $\overline{AD}$ and C the midpoint of $\overline{AE}$. The two medians $\overline{BE}$ and $\overline{CD}$ are drawn, as shown, intersecting in point F, the centroid.

    $\triangle FCB \sim \triangle FDE$ with scale factor $k = 2$.

    Given $BC = 9$, find DE.

    Given $FE = 12$, find BF.



19. Write down the center and radius of each circle.

    (a) $(x+1)^2 + (y-1)^2 = 16$

    (b) $(x-2)^2 + (y-7)^2 = 25$

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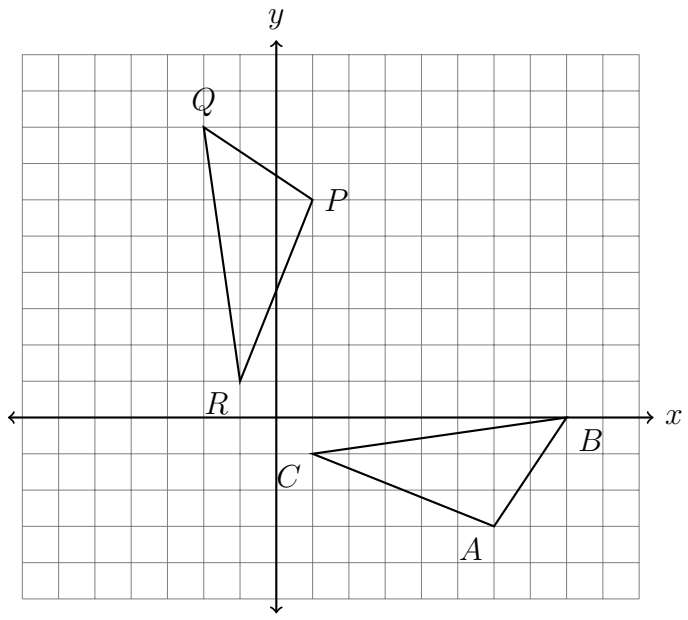
20. Determine and state the transformation or sequence of transformations applied to $\triangle ABC$, mapping it onto $\triangle PQR$, as shown.



21. 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) $\overline{AE} \rightarrow$ _____

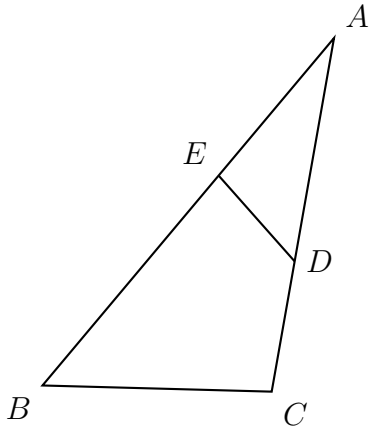
(b) $\overline{AD} \rightarrow$ _____

(c) $\triangle ADE \sim$ _____

(d) What is the scale factor?

$k =$ _____

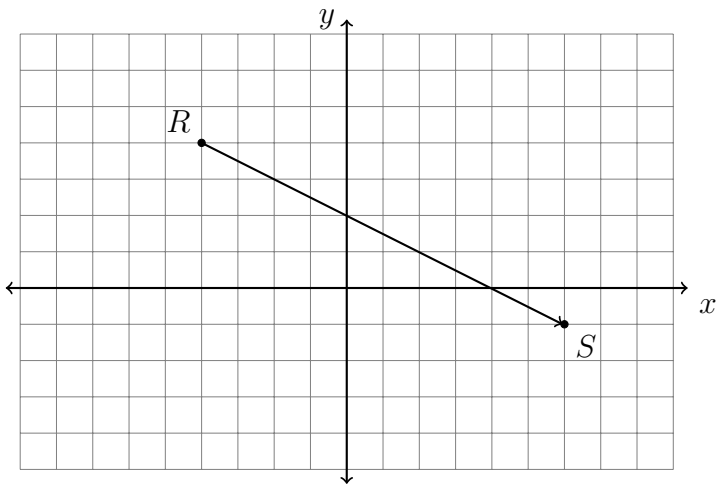
(e) What is the length of $\overline{BC}$?



22. Given $\triangle JKL \sim \triangle MNO$. $m\angle J = 43°$ and $m\angle L = 92°$.
Find the measure of $\angle N$.

23. A translation maps $A(3, 5) \rightarrow A'(-2, 7)$. What is the image of $B(-4, 1)$ under the same translation?

24. As shown below, what is the translation that maps the point $R(-4, 4)$ onto the point $S(6, -1)$?



If two fifths of that translation was performed, what coordinates would R be mapped to?

25. Given $A(-3, 5)$ and $B(0, -1)$, find the length of $\overline{AB}$. Leave the result in simplified radical form (not a decimal).

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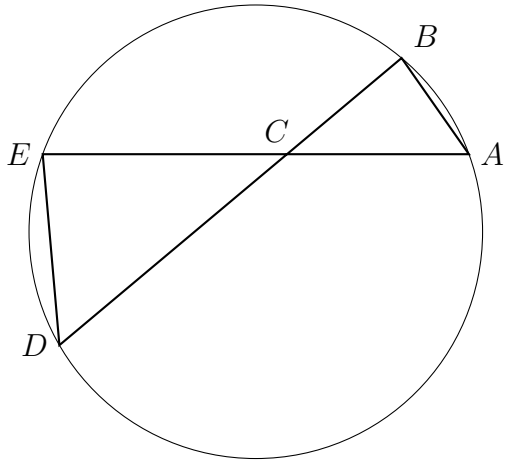
26. In the diagram below, the chords $\overline{AE}$ and $\overline{BD}$ intersect at C, with $\triangle ABC \sim \triangle DEC$, $BC = 3$, $AC = 4$, and $AE = 11$. Determine the length of $\overline{CD}$.



27. In the diagram below, $\triangle ABC \sim \triangle DEF$, $DE = 6$, $AB = x$, $AC = 2x$, and $DF = 2x + 4$. Determine the length of $\overline{AB}$.