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**9-12 Homework: Review Similar triangles, dilation ratios, transformations**

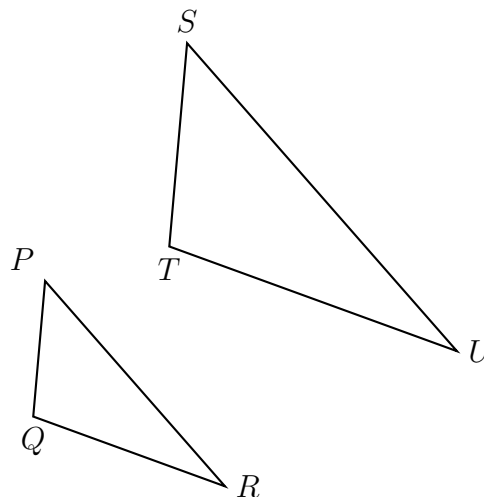
1. A dilation maps triangle  $PQR$  onto triangle  $STU$  with  $QR = 4$  and  $TU = 6$ .

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

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

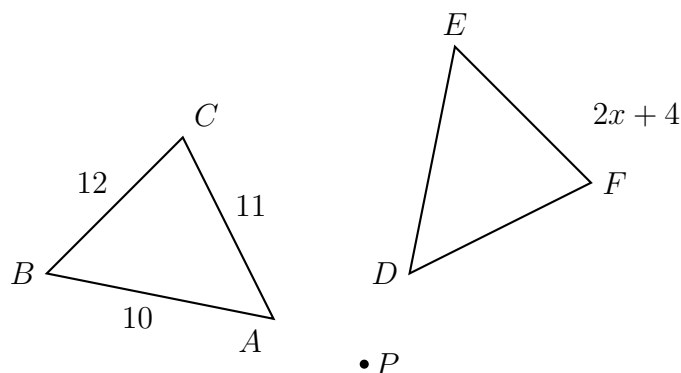
(c) Given  $PR = 8$ , find  $SU$ .

(d) Given  $ST = 9$ , find  $PQ$ .



2. After a dilation with center  $(0, 0)$ , the image of  $\overline{RS}$  is  $\overline{R'S'}$ . If  $RS = 6.4$  and  $R'S' = 32$ , find the scale factor of this dilation.

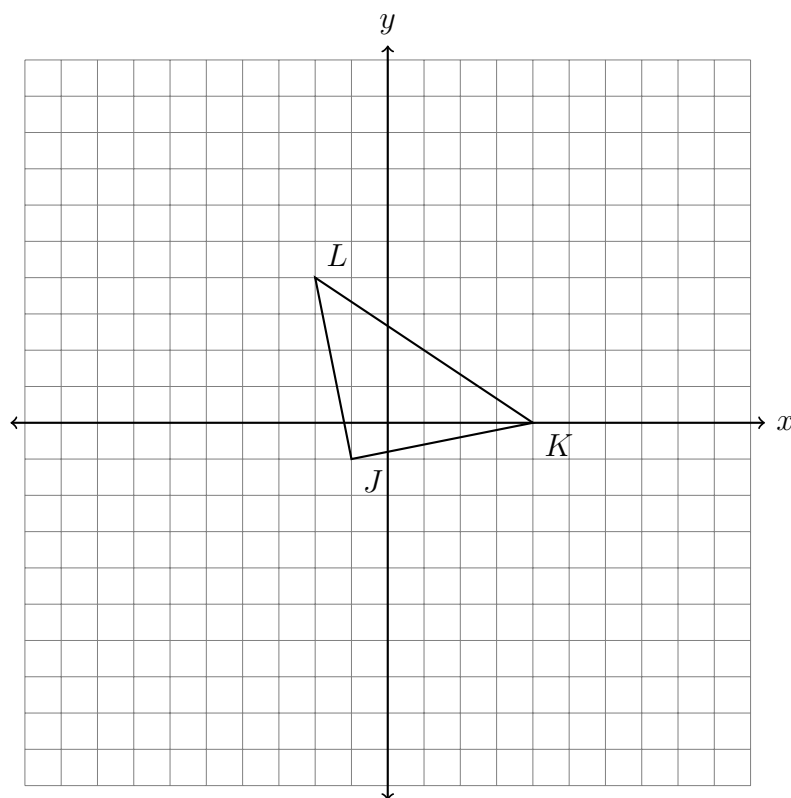
3. In the diagram below,  $\triangle ABC$  with sides of 10, 12, and 11, is mapped onto  $\triangle DEF$  after a clockwise rotation of  $90^\circ$  about point  $P$ .



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

4. The vertices of  $\triangle JKL$  have the coordinates  $J(-1, -1)$ ,  $K(4, 0)$ , 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  $k = 2$ . 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.

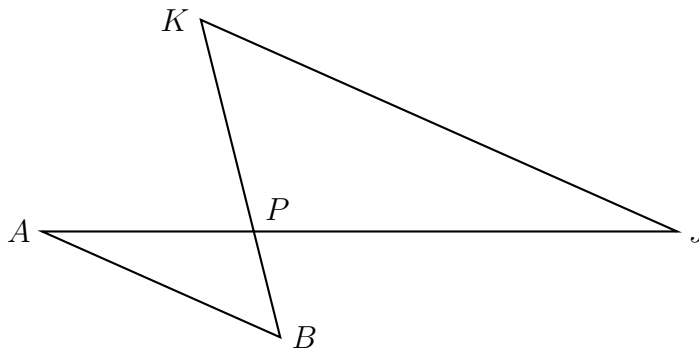


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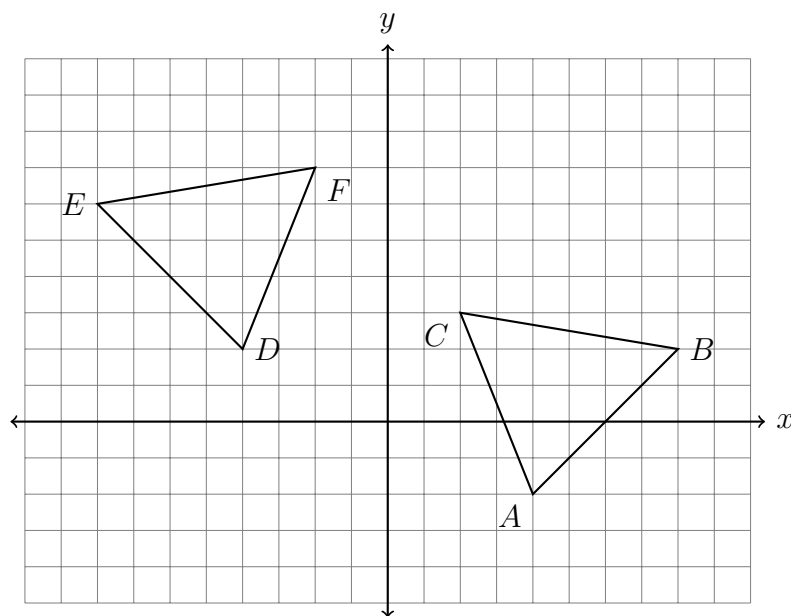
5. What is the length of the segment  $A(-2, 13)$ ,  $B(3, 1)$ ?

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

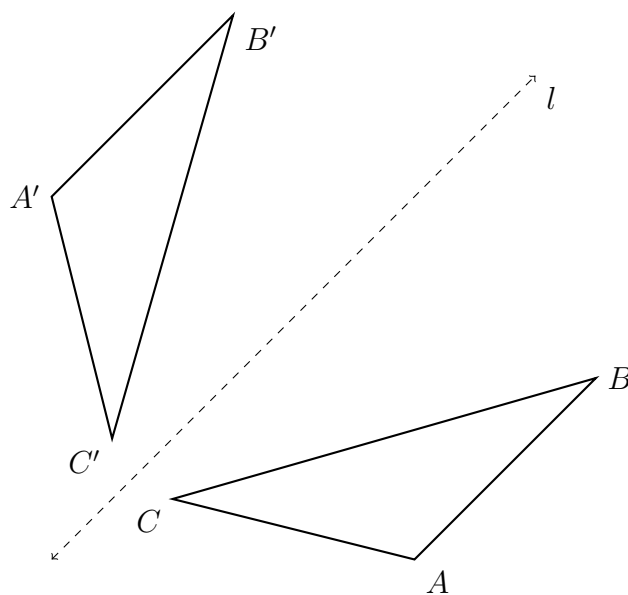
7. Given  $\triangle ABP$  and  $\triangle JKP$  as shown below.  $\overline{AB} \parallel \overline{JK}$ .  $AP = 5$ ,  $JP = 13$ , and  $JK = 20.8$ . Find  $AB$ .



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



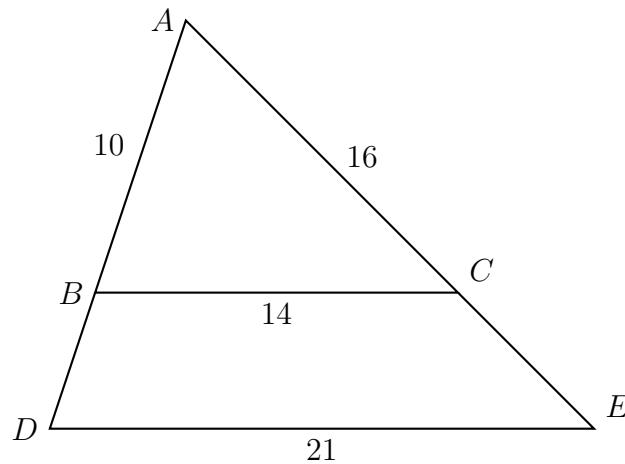
9. The  $\triangle ABC$  is reflected across  $l$  to yield  $\triangle A'B'C'$ .  $AB = 3x + 4$ ,  $A'B' = 5x - 10$ , and  $BC = 4x + 12$ . Find the length  $B'C'$ .



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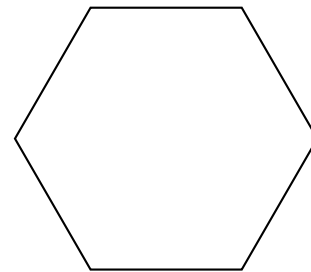
10. Triangle  $ABC$  is dilated with a scale factor of  $k$  centered at  $A$ , yielding  $\triangle ADE$ , as shown. Given  $AB = 10$ ,  $BC = 14$ ,  $AC = 16$ , and  $DE = 21$ .

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

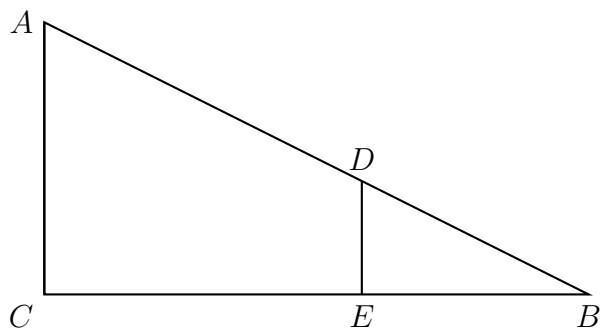


11. Circle YES or NO to indicate whether the given transformation maps the hexagon onto itself.

- (a) Yes   No   A rotation of  $120^\circ$  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  $60^\circ$  clockwise around the hexagon's center.



12. 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  $\overline{BE}$ ?

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13. 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     $5x - 3y = 6$

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

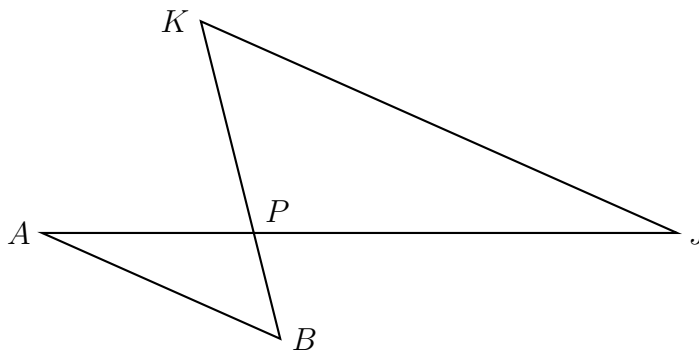
(a)  $\sqrt{20}$

(c)  $\sqrt{300}$

(b)  $\sqrt{75}$

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

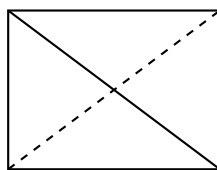
15. Given  $\triangle ABP$  and  $\triangle JKP$  as shown below.  $\overline{AB} \parallel \overline{JK}$ .  $AP = 5$ ,  $JP = 12$ , and  $JK = 18$ . Find  $AB$ .





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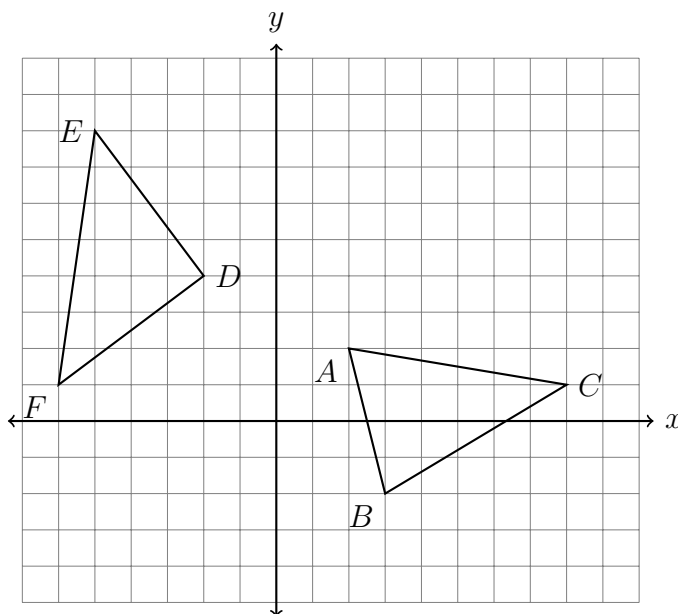
16. The figure shows a rectangle (not a square).



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

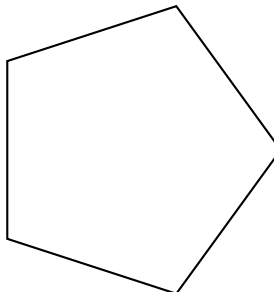
- |   |      |       |
|---|------|-------|
| (a) A reflection over the solid diagonal  | True | False |
| (b) A reflection over the dashed diagonal                                       | True | False |
| (c) A clockwise rotation of $90^\circ$ about the intersection of the diagonals  | True | False |
| (d) A clockwise rotation of $180^\circ$ about the intersection of the diagonals | True | False |

17. 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.

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

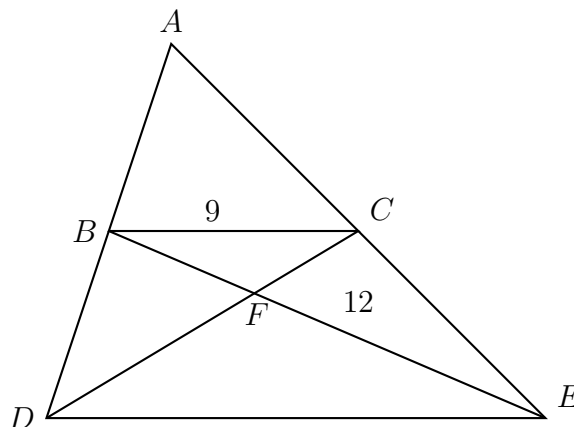


19. Triangle  $ADE$  and its midline  $\overline{BC}$  are drawn, with  $B$  the midpoint of  $\overline{AD}$  and  $C$  the midpoint of  $\overline{AE}$ . The two medians  $\overline{BE}$  and  $\overline{CD}$  are drawn, as shown, intersecting in point  $F$ , the centroid.

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

Given  $BC = 9$ , find  $DE$ .

Given  $FE = 12$ , find  $BF$ .



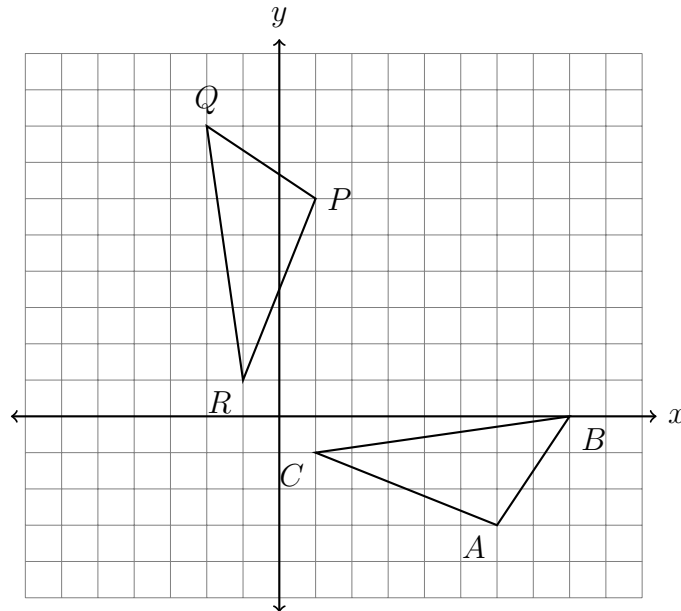
20. Write down the center and radius of each circle.

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

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

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



22. 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)  $\overline{AE} \rightarrow$  \_\_\_\_\_

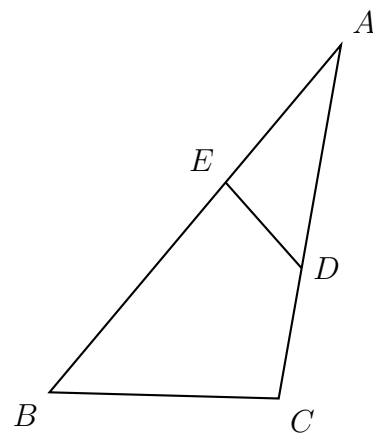
(b)  $\overline{AD} \rightarrow$  \_\_\_\_\_

(c)  $\triangle ADE \sim$  \_\_\_\_\_

(d) What is the scale factor?

$k =$  \_\_\_\_\_

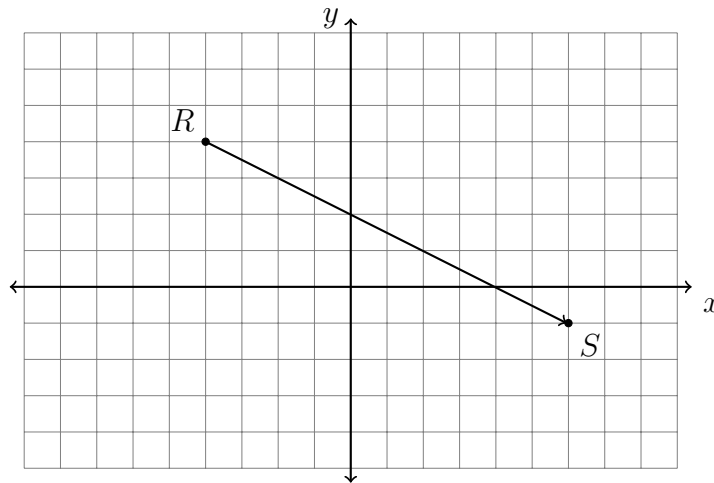
(e) What is the length of  $\overline{BC}$ ?



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

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

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

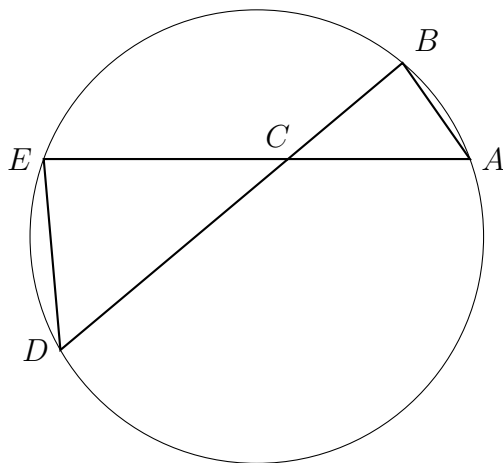


If two fifths of that translation was performed, what coordinates would  $R$  be mapped to?

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

*Early finishers*

27. 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  $\overline{CD}$ .



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

