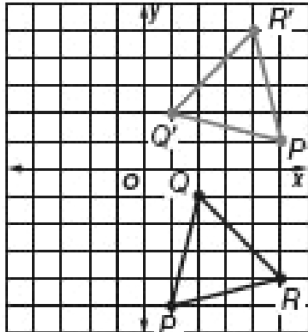


11-10 Rotations - Practice and Problem Solving

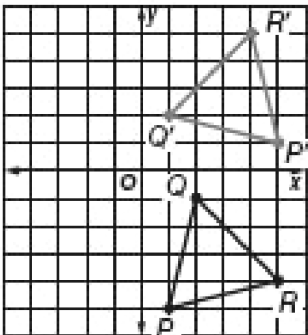
Triangle PQR has vertices $P(1, -5)$, $Q(2, -1)$, and $R(5, -4)$. Graph the figure and its image after each rotation. Then give the coordinates of the vertices for triangle $P'Q'R'$.

7. 270° clockwise



$P'(5, 1)$, $Q'(1, 2)$, $R'(4, 5)$

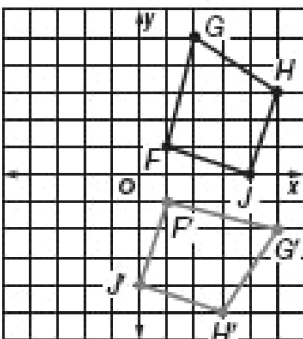
9. 90° counterclockwise



$P'(5, 1)$, $Q'(1, 2)$, $R'(4, 5)$

Quadrilateral $FGHJ$ has vertices $F(1, 1)$, $G(2, 5)$, $H(5, 3)$, and $J(4, 0)$. Graph the figure and its image after each rotation. Then give the coordinates of the vertices for quadrilateral $F'G'H'J'$.

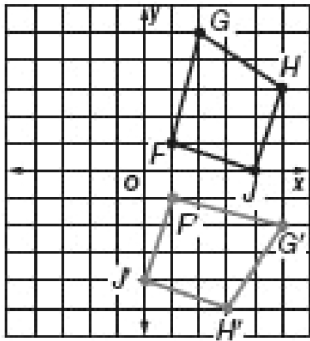
11. 90° clockwise



$F'(1, -1)$, $G'(5, -2)$, $H'(3, -5)$, $J'(0, -4)$

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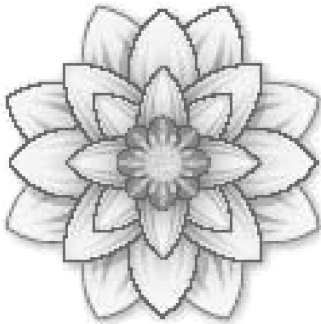
13. 270° counterclockwise



$F'(1, -1)$, $G'(5, -2)$, $H'(3, -5)$, $I'(0, -4)$

Determine whether each figure has rotational symmetry. Write *yes* or *no*. If *yes*, name its angle(s) of rotation.

- 15.



yes; 45° , 90° , 135° , 180° , 225° , 270° , 315° , and 360°

- 17.

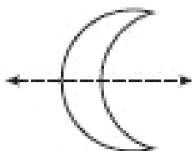


yes; 120° , 240° , and 360°

GEOMETRY Use the information on line symmetry on page 611 and the following information.

19. Draw a figure that has line symmetry but does not have rotational symmetry.

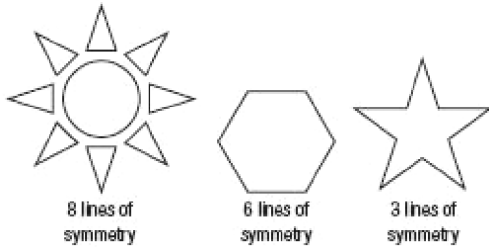
Sample answer:



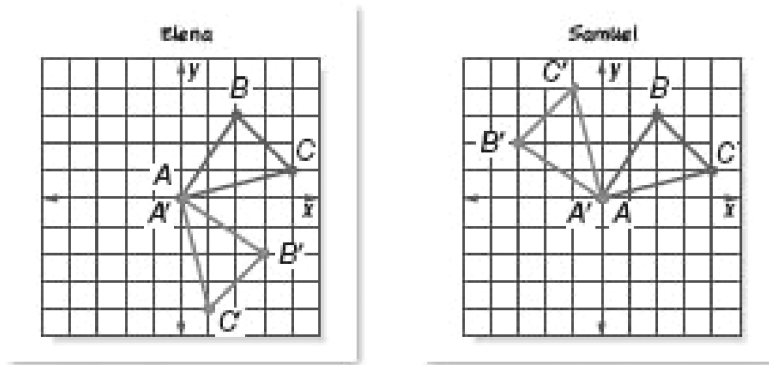
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21. Is it possible for a figure to have rotational symmetry, but not line symmetry? Justify your response with a drawing or an explanation.

no; Sample answer: if a figure has rotational symmetry, then it has at least one line of symmetry.



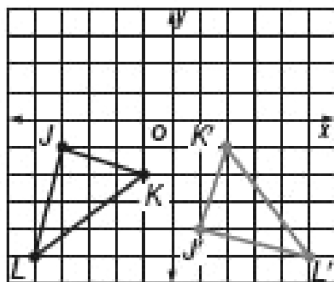
23. **FIND THE ERROR** Elena and Samuel are graphing triangle ABC with vertices at $A(0, 0)$, $B(2, 3)$, and $C(4, 1)$ and its image after a rotation 90° counterclockwise about the origin. Who is correct? Explain.



Samuel; Sample answer: Elena rotated the image 90° clockwise.

CHALLENGE Triangle JKL has vertices $J(-4, -1)$, $K(-1, -2)$, and $L(-5, -5)$. Graph the figure and its image after each rotation about the origin. Then give the coordinates of the vertices for triangle $J'K'L'$.

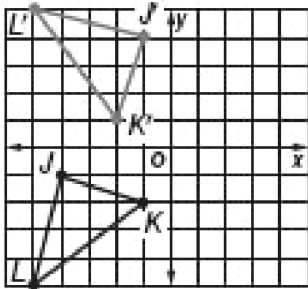
25. 450° counterclockwise



$J'(1, -4)$, $K'(2, -1)$, and $L'(5, -5)$

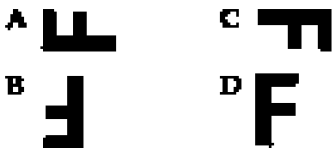
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27. 630° counterclockwise



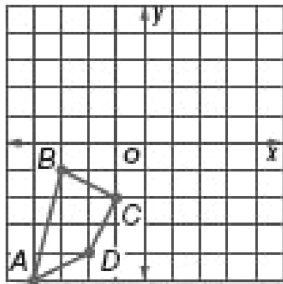
$J(-1, 4)$, $K(-2, 1)$, and $L(-5, 5)$

29. Which figure shows the letter F after a rotation of 270° clockwise?

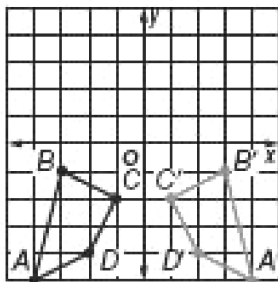


A

Graph quadrilateral $ABCD$ and its resulting image after each transformation.

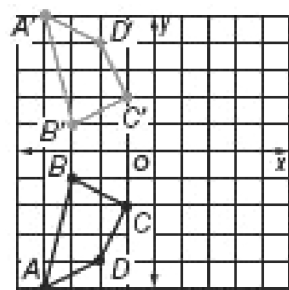


31. reflection over the y -axis



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33. reflection over the x -axis



35. reflection over the x -axis, then over the y -axis

