

Lesson 2.4 Rotations

Learning Targets:

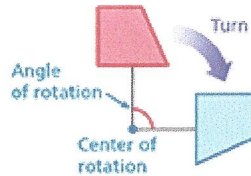
- Identify a Rotation
- Rotate a Figure Around a Point
- Use More than One Transformation
- Describe a Sequence of Transformations

Key Idea

Rotations

A **rotation**, or *turn*, is a transformation in which a figure is rotated about a point called the **center of rotation**. The number of degrees a figure rotates is the **angle of rotation**.

In a rotation, the original figure and its image are congruent.



Clockwise



Counterclockwise

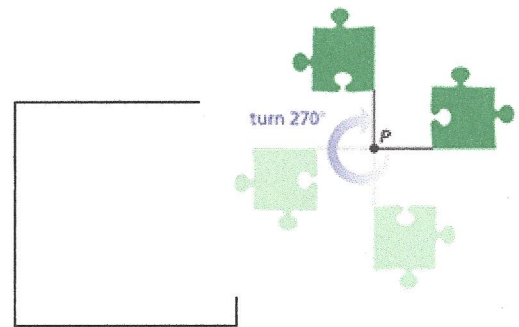


1 Identifying a Rotation

You must rotate the puzzle piece 270° clockwise about point P to fit it into a puzzle. Which piece fits in the puzzle as shown?



Answer C



1. Which piece is a 90° counterclockwise rotation about point P ?

C : A 270° rotation ^{in one direction} is the same as a 90° rotation ^{in the opposite direction}

2. Is choice D a rotation of the original puzzle piece? If not what kind of transformation does the image show?

No! It's a reflection in the y -axis

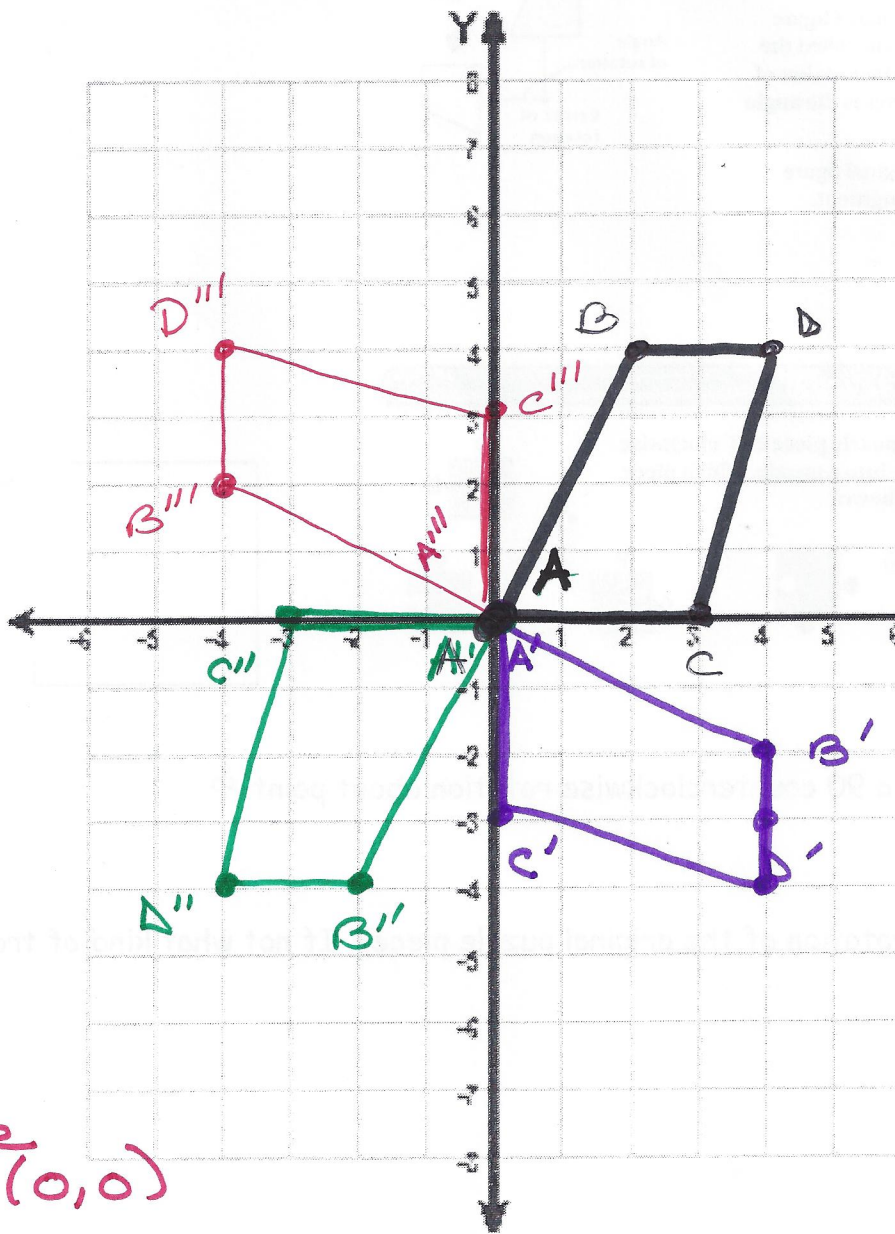


Rotating A Figure

NOTE TO C-1:
I changed the coordinates
of point C



Coordinate Rules	A (0, 0) B(2, 4) C (3, 0) D (4, 4)	Describe the Rotation
$(x, y) \rightarrow (y, -x)$	$A'(0, 0) B'(4, -2) C'(0, -3) D'(4, -4)$	90° clockwise OR 270° counter-clockwise
$(x, y) \rightarrow (-x, -y)$	$A''(0, 0) B''(-2, -4) C''(-3, 0) D''(-4, -4)$	180° in both directions
$(x, y) \rightarrow (-y, x)$	$A'''(0, 0) B'''(-4, 2) C'''(0, 3) D'''(-4, 4)$	270° clockwise 90° counter-clockwise



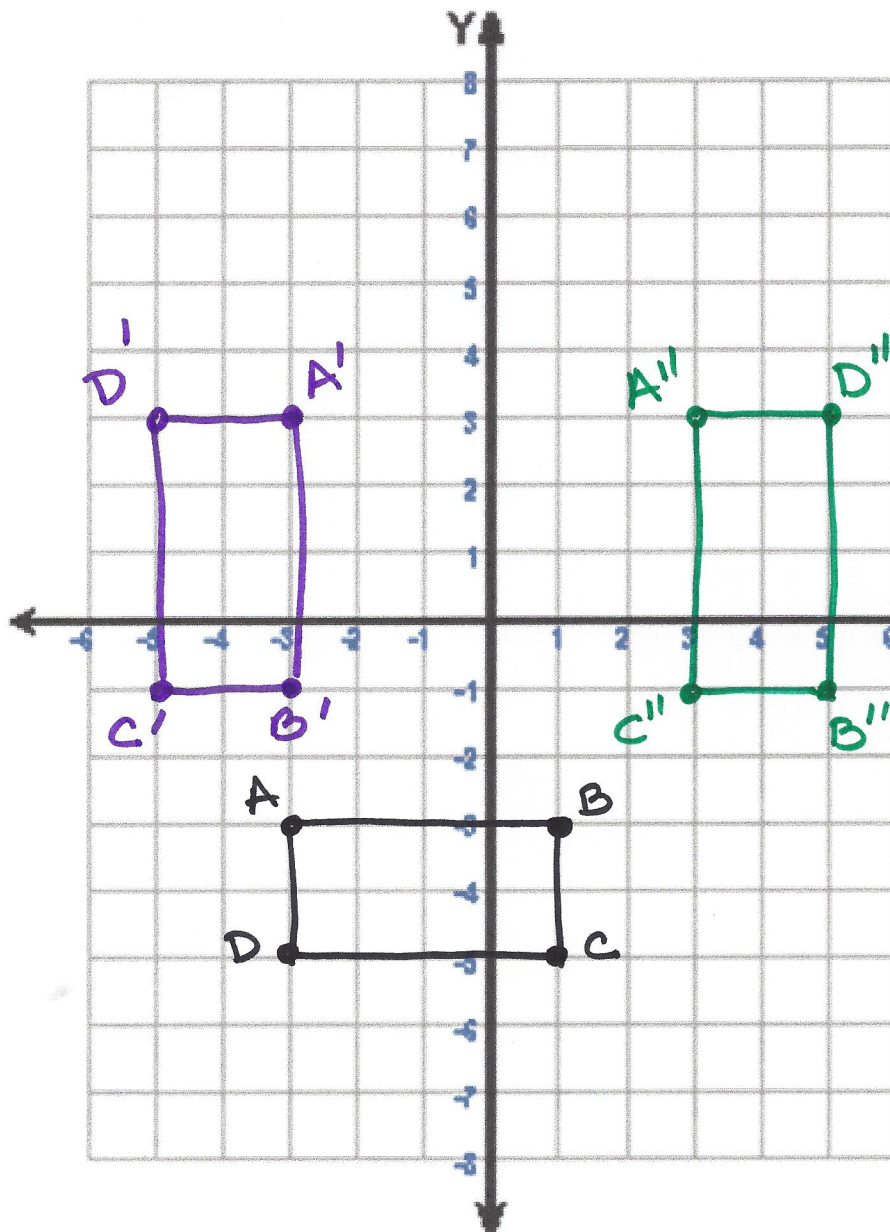
(NOTE: NORMALLY in Alphabetical order, but I needed to "fix" point C, so this isn't in the correct order)

rotating about the origin (0,0)



Using More than One Transformation

The vertices of a rectangle are $A(-3, -3)$, $B(1, -3)$, $C(1, -5)$, and $D(-3, -5)$. Rotate the rectangle 90° clockwise about the origin, and then reflect it in the y -axis. What are the coordinates of the image? ^{Final}



Rule $(y, -x)$

$A'(-3, 3)$

$B'(-3, -1)$

$C'(-5, -1)$

$D'(-5, 3)$

Rule $(-x, y)$

$A''(3, 3)$

$B''(3, -1)$

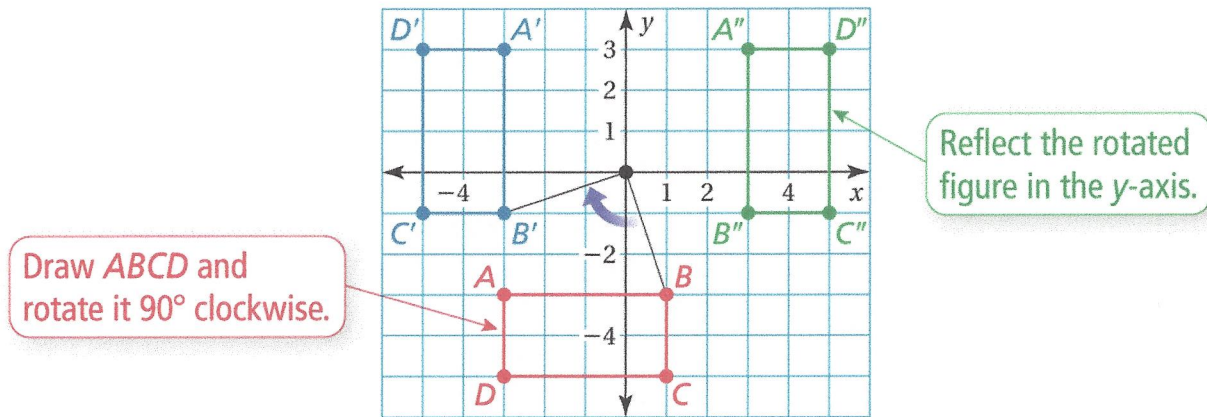
$C''(5, -1)$

$D''(5, 3)$

Coordinates
of final
Image

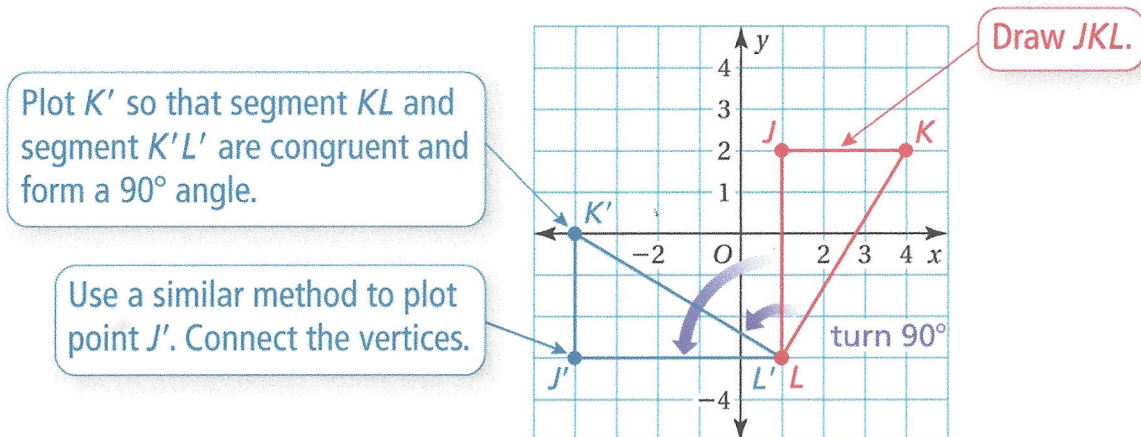
Examples as shown from the book

The vertices of a rectangle are $A(-3, -3)$, $B(1, -3)$, $C(1, -5)$, and $D(-3, -5)$. Rotate the rectangle 90° clockwise about the origin, and then reflect it in the y -axis. What are the coordinates of the image?



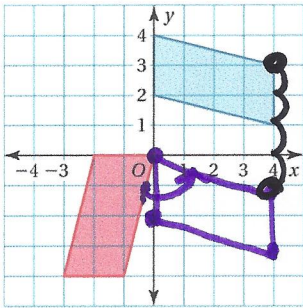
Reflecting around a Point (other than the origin)

The vertices of a triangle are $J(1, 2)$, $K(4, 2)$, and $L(1, -3)$. Rotate the triangle 90° counterclockwise about vertex L . What are the coordinates of the image?





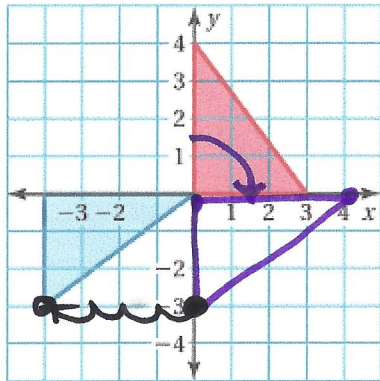
Describing a Sequence of Transformations



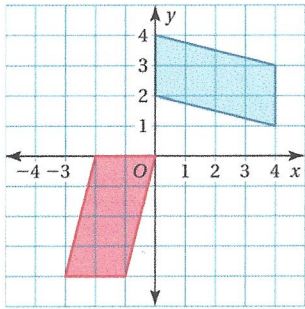
The red figure is congruent to the blue figure. Describe a sequence of transformations in which the blue figure is the image of the red figure.

1st: 90° turn counterclockwise (or 270° clockwise)
2nd: Translate up 4 units

The red figure is congruent to the blue figure. Describe a sequence of transformations in which the blue figure is the image of the red figure.



1st: 90° rotation clockwise, (or 270° counter-clockwise)
2nd: Translate left 4 units.

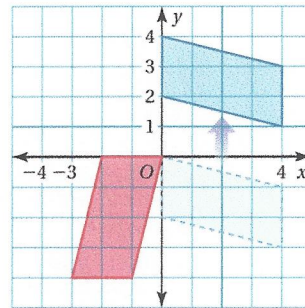


The red figure is congruent to the blue figure. Describe a sequence of transformations in which the blue figure is the image of the red figure.

You can turn the red figure 90° so that it has the same orientation as the blue figure. So, begin with a rotation.

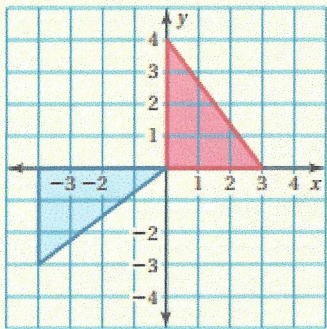
After rotating, you need to slide the figure up.

So, one possible sequence of transformations is a 90° counterclockwise rotation about the origin followed by a translation 4 units up.



SAME Examples From the book

The red figure is congruent to the blue figure. Describe a sequence of transformations in which the blue figure is the image of the red figure.



Sample answer: 90° clockwise rotation about the origin followed by a translation 4 units left

Homework: Pg 65-67 #2-6 all, #10-14 all
#17-25 all