

# Curriculum Outcomes

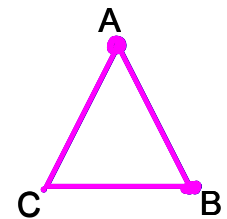
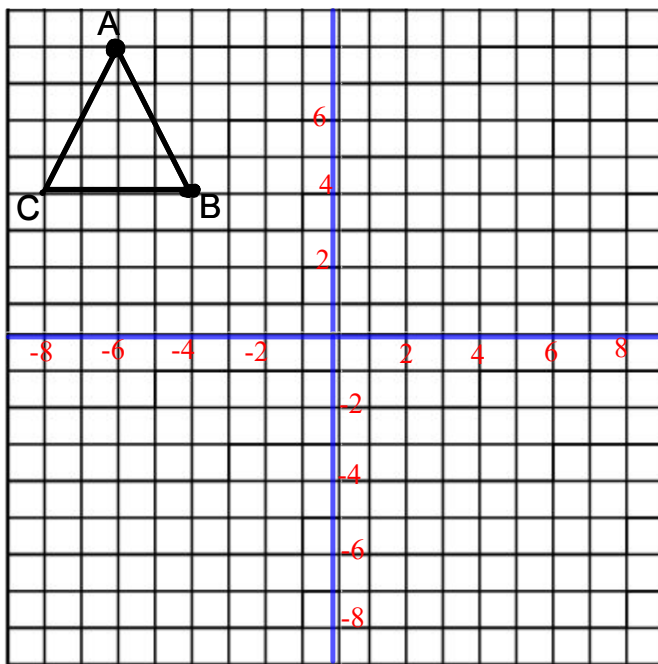
(SS3) Demonstrate an understanding of similarity of polygons.

(SS4) Draw and interpret scale diagrams of 2-D shapes.

(SS5) Demonstrate an understanding of line and rotation symmetry.

Student Friendly: Rotating shapes a certain degrees, about certian point.

# Warm Up



A( , )

B( , )

C( , )

a) Reflect the triangle ABC about the vertical line -1

A'( , )

B'( , )

C'( , )

b) Reflect the triangle ABC about the horizontal line 2

A''( , )

B''( , )

C''( , )

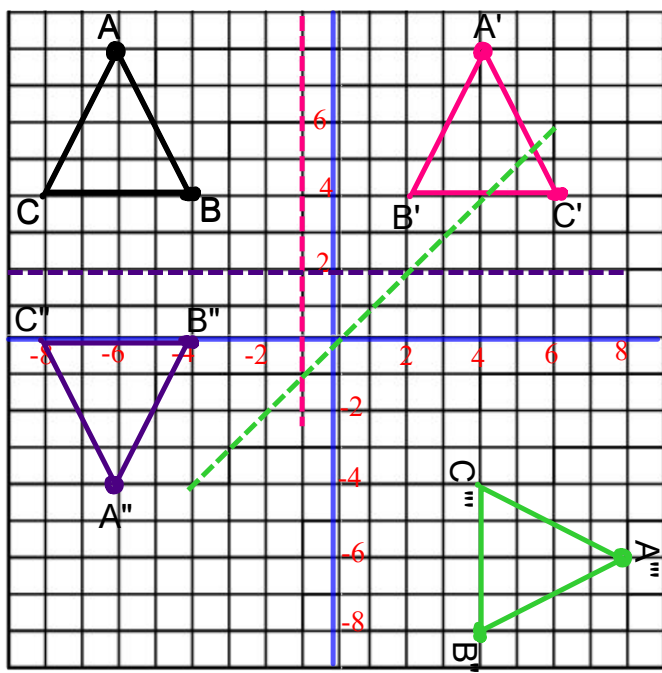
c) Reflect the triangle ABC about the oblique line (-3, -3) and (6, 6)

A'''( , )

B'''( , )

C'''( , )

# Warm Up



A( -6 , 8 )

B( -4 , 4 )

C( -8 , 4 )

a) Reflect the triangle ABC about the vertical line -1

A'( 4 , 8 )

B'( 2 , 4 )

C'( 6 , 4 )

b) Reflect the triangle ABC about the horizontal line 2

A''( -6 , 4 )

B''( -4 , 0 )

C''( -8 , 0 )

c) Reflect the triangle ABC about the oblique line (-3, -3) and (6, 6)

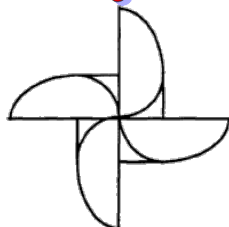
A'''( 8 , -6 )

B'''( 4 , -4 )

C'''( 4 , -8 )

# Section 7.6

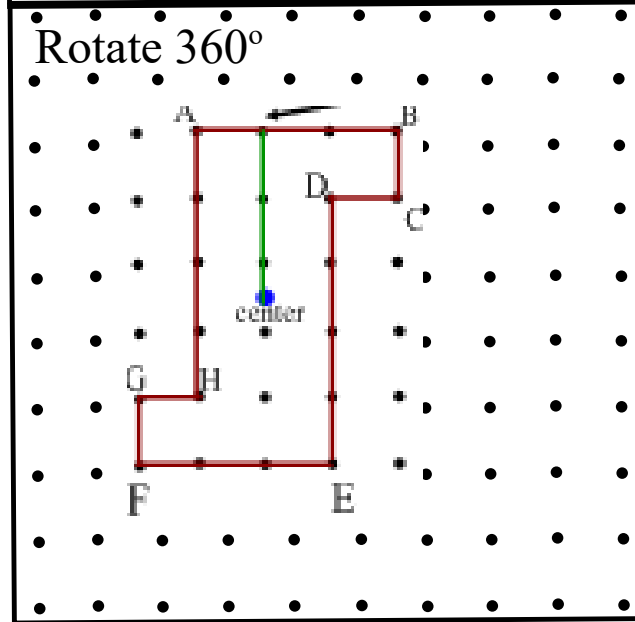
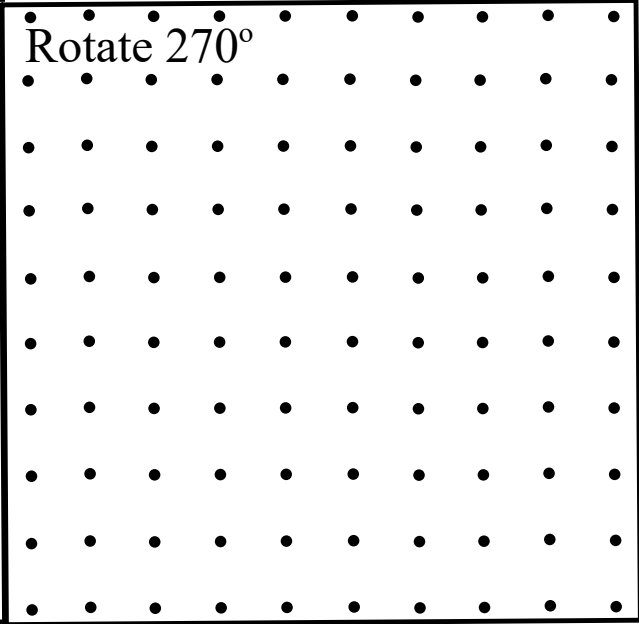
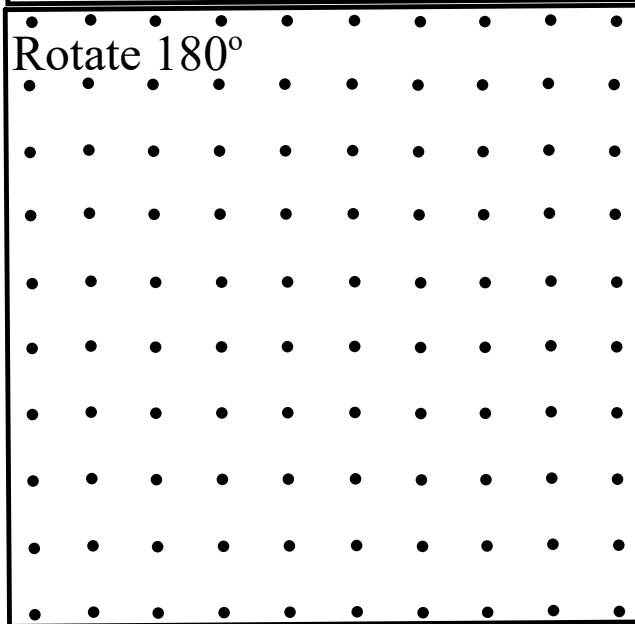
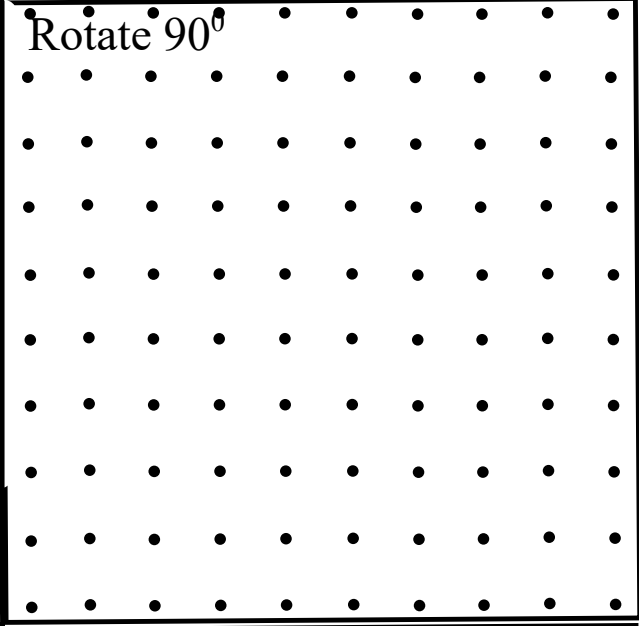
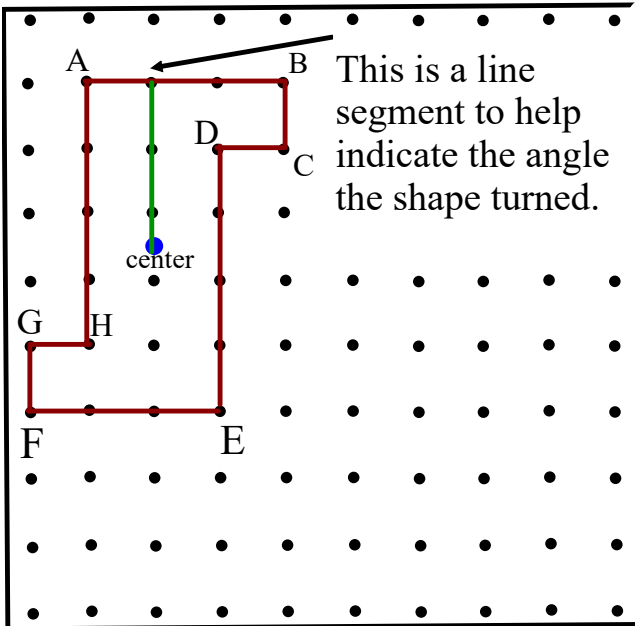
# Rotations & Rotational Symmetry





Lets rotate this object about its center

On your copy draw the rotated figure



Which pictures look like the original?

Lets rotate this object about its center

On your copy draw the rotated figure

	<p>Rotate <math>90^\circ</math></p>
<p>Rotate <math>180^\circ</math></p>	<p>Rotate <math>270^\circ</math></p>
<p>Rotate <math>360^\circ</math></p>	<p>Which pictures look like the original?              180° 360°</p> <p>How many ??? <u>2</u></p> <p><b>coincides</b>: looks the same as the original</p>

LOOK AT THE NEXT SLIDE THEN COME BACK TO THIS

This object has Rotational symmetry of ord 2.

Angle of Rotaional Symmetry \_\_\_\_\_

= \_\_\_\_\_

= \_\_\_\_\_

# Rotations

A shape has rotational symmetry when it coincides with itself after a rotation of  $360^\circ$  about its centre.



Order of Rotation is the number of times a shape coincides with itself during a  $360^\circ$  rotation

How to state this?

rotational symmetry of order \_\_\_\_\_

Angle of Rotational Symmetry:  $\frac{360^\circ}{\text{the order of rotation}}$

Note:

A shape that requires a rotation of  $360^\circ$  to return to its original shape does not have a rotational symmetry. A shape cannot have a rotational symmetry of 1.

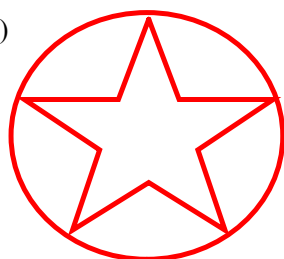
Look at the web book video in rotations

[www.mathmakessense.ca](http://www.mathmakessense.ca)

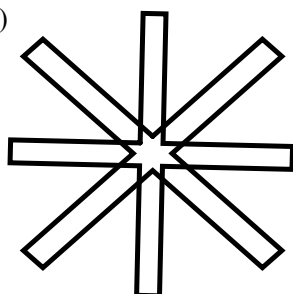


Determine if the following shapes have rotational symmetry. If so state the order of rotation and the angle of rotation symmetry.

1)



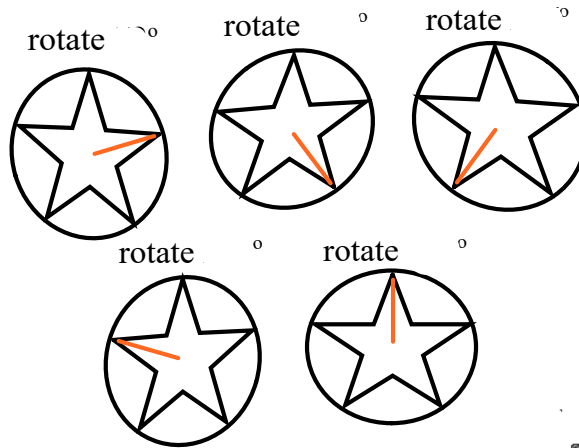
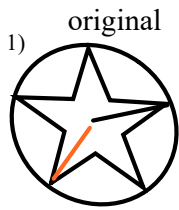
2)



3)

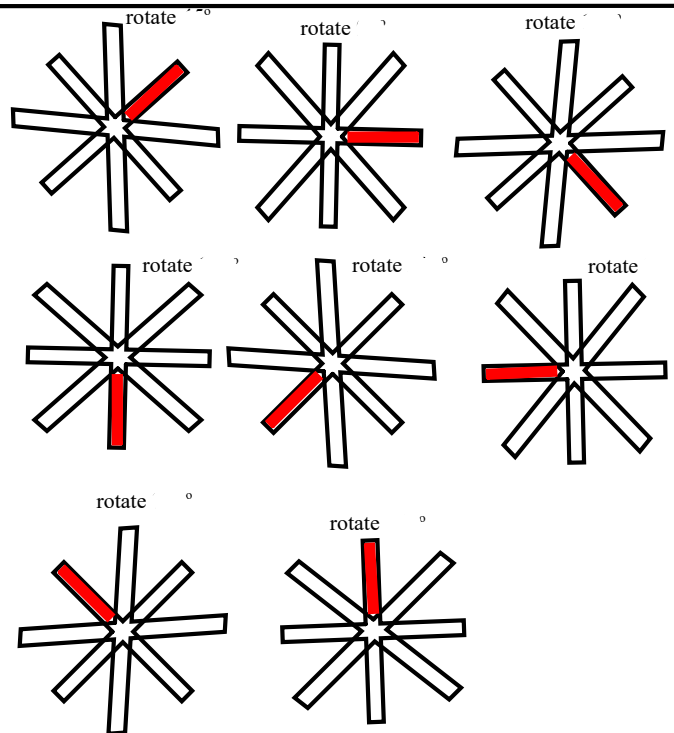
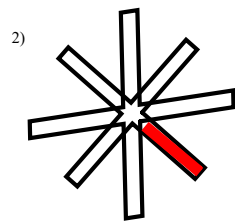


Determine if the following shapes have rotational symmetry. If so, state the order of rotation and the angle of rotational symmetry.



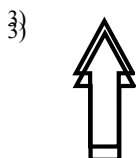
Rotational symmetry of order 5

Angle of rotation:  $\frac{360^\circ}{5} = 72^\circ$



Rotational symmetry of order 8

Angle of rotation:  $\frac{360^\circ}{8} = 45^\circ$



Is rotated one complete turn before it coincides. It **DOES NOT** have rotational symmetry.

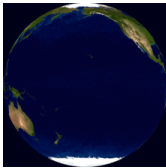
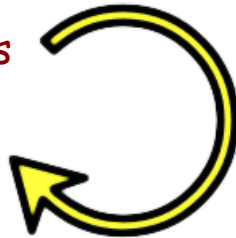
# Rotational Directions

requires  
1 of  
book  
  
u're  
ok  
ion 16

clockwise



Counter - Clock Wise Rotations



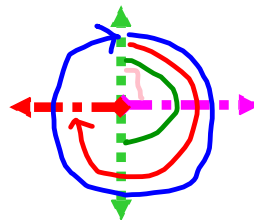
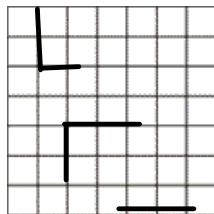
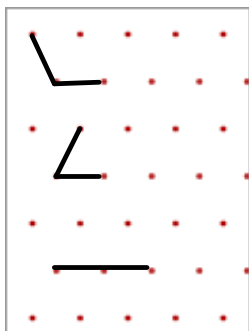
Earth turns counter-clockwise.



## Rotations Are Transformations

Text book

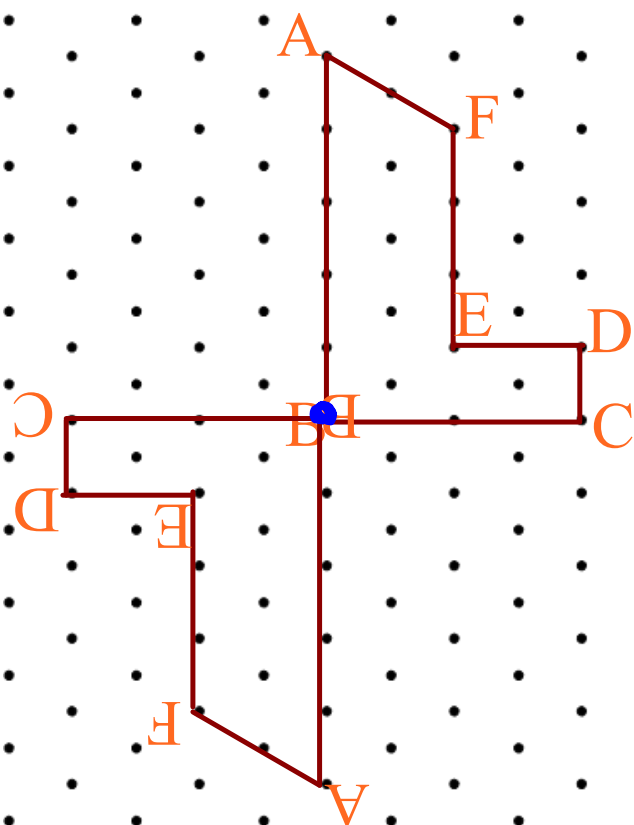
- Grid paper will be used to illustrate rotations of  $90^\circ$  (or  $180^\circ$  or  $270^\circ$ )



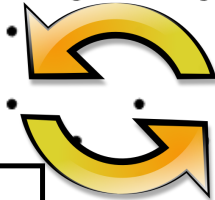
# Rotating Images



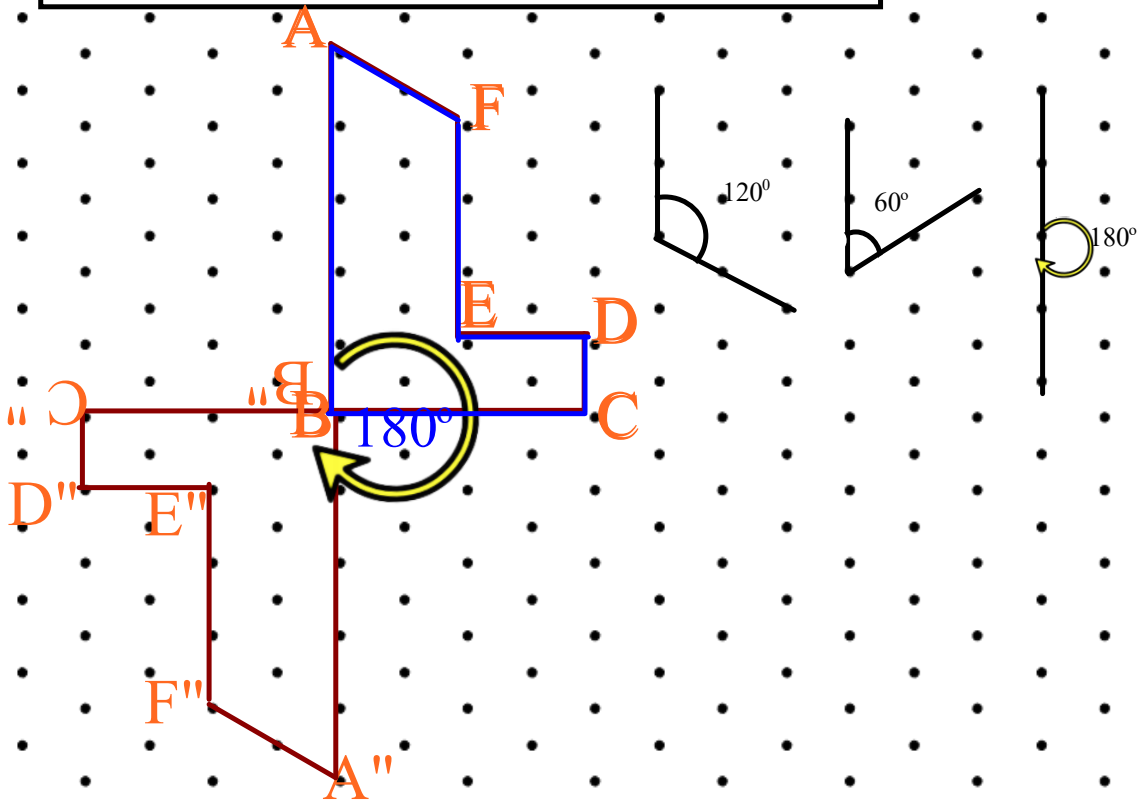
Rotate the image 180° clockwise about vertex B.  
Draw the rotation image.  
Pick a line connected from the vertex of interest



# Rotating Images



Rotate the image 180° clockwise about vertex B.  
Draw the rotation image.

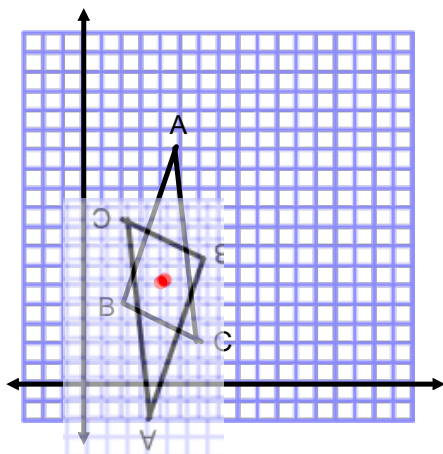




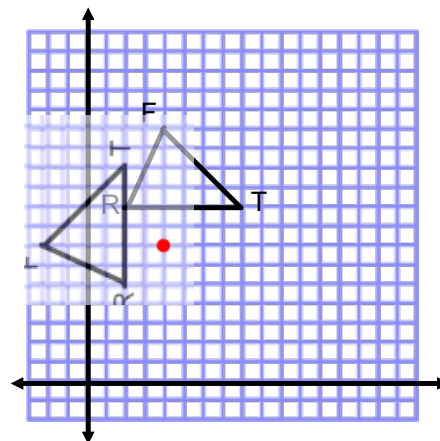
Draw and label the rotated image for each triangle. Label the center of rotation (given in the question)

**Step 1)** Trace the shape on your own paper and rotate that shape holding your finger or pencil at the rotation center.

1) Rotation  $180^\circ$  counterclockwise, center  $R(4, 5)$



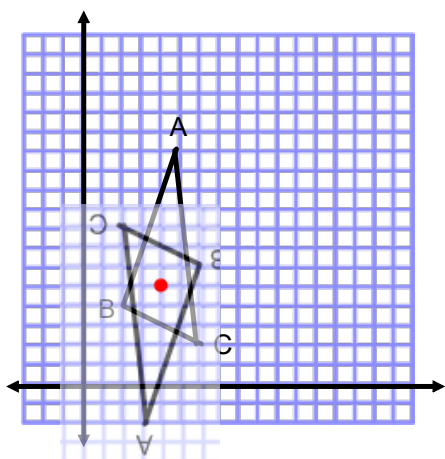
2) Rotation  $90^\circ$  counterclockwise, center  $R(4, 7)$



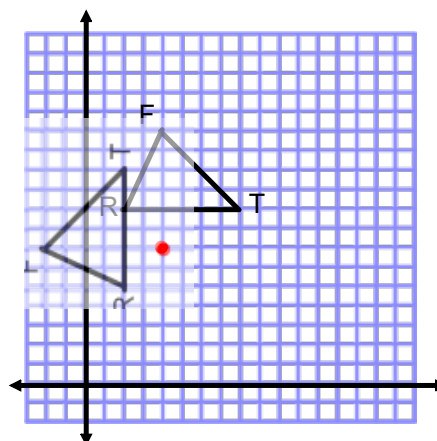
Draw and label the rotated image for each triangle. Label the center of rotation (given in the question)

**Step 1)** Trace the shape on your own paper and rotate that shape holding your finger or pencil at the rotation center.

1) Rotation  $180^\circ$  counterclockwise, center  $R(4, 5)$

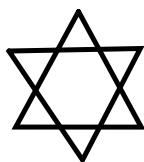


2) Rotation  $90^\circ$  counterclockwise, center  $R(4, 7)$



Determine if the following shapes have rotational symmetry. If so state the order of rotation and the angle of rotational symmetry.

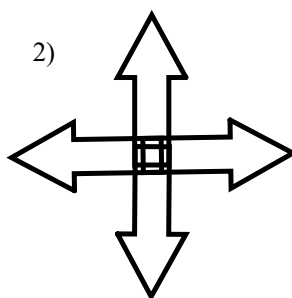
1)



Rotational Symmetry = 6

$$\begin{aligned}\text{Angle of Rotation} &= \frac{360^\circ}{6} \\ &= 60^\circ\end{aligned}$$

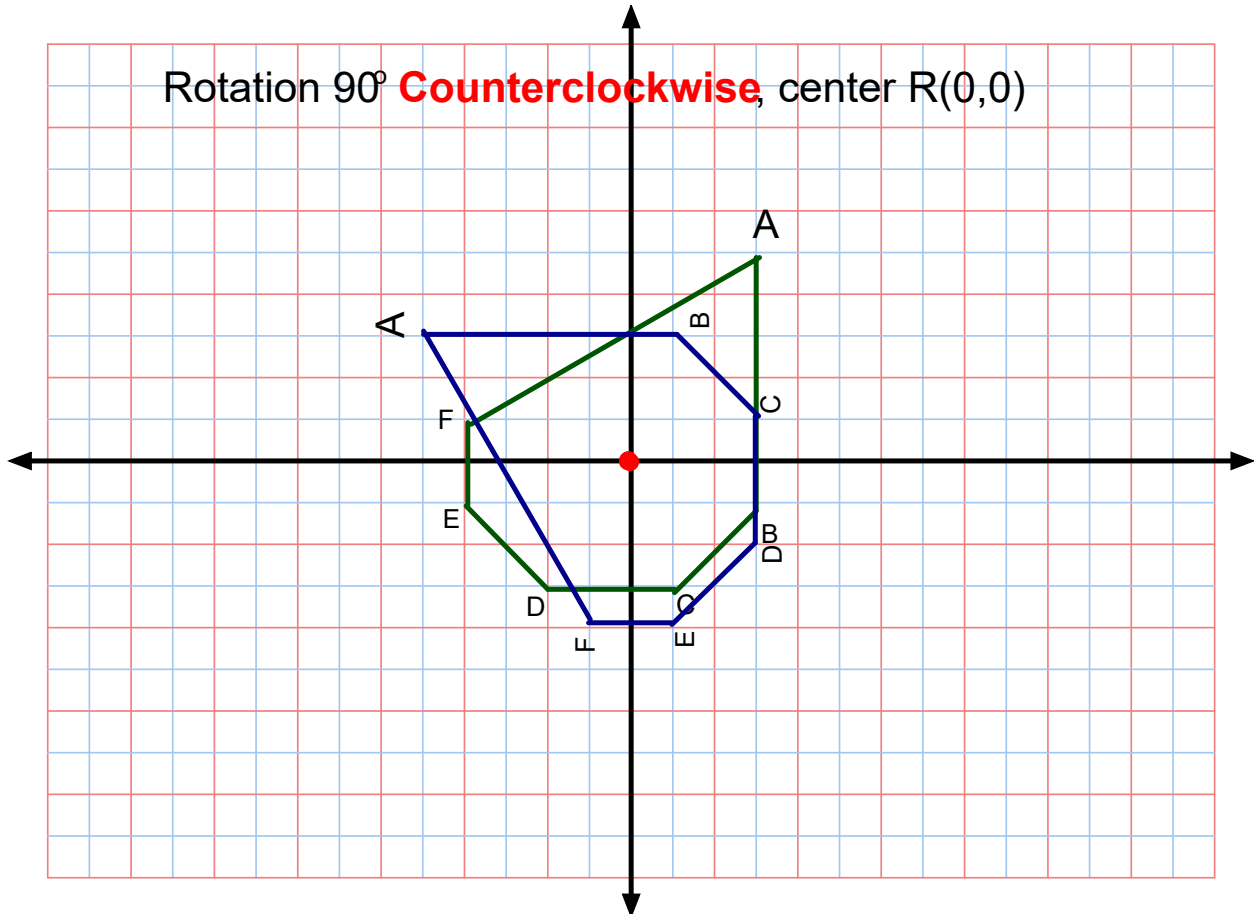
2)



Rotational Symmetry = 4

$$\begin{aligned}\text{Angle of Rotation} &= \frac{360^\circ}{4} \\ &= 90^\circ\end{aligned}$$





A( , ) E( , )

A'( , ) E'( , )

B( , ) F( , )

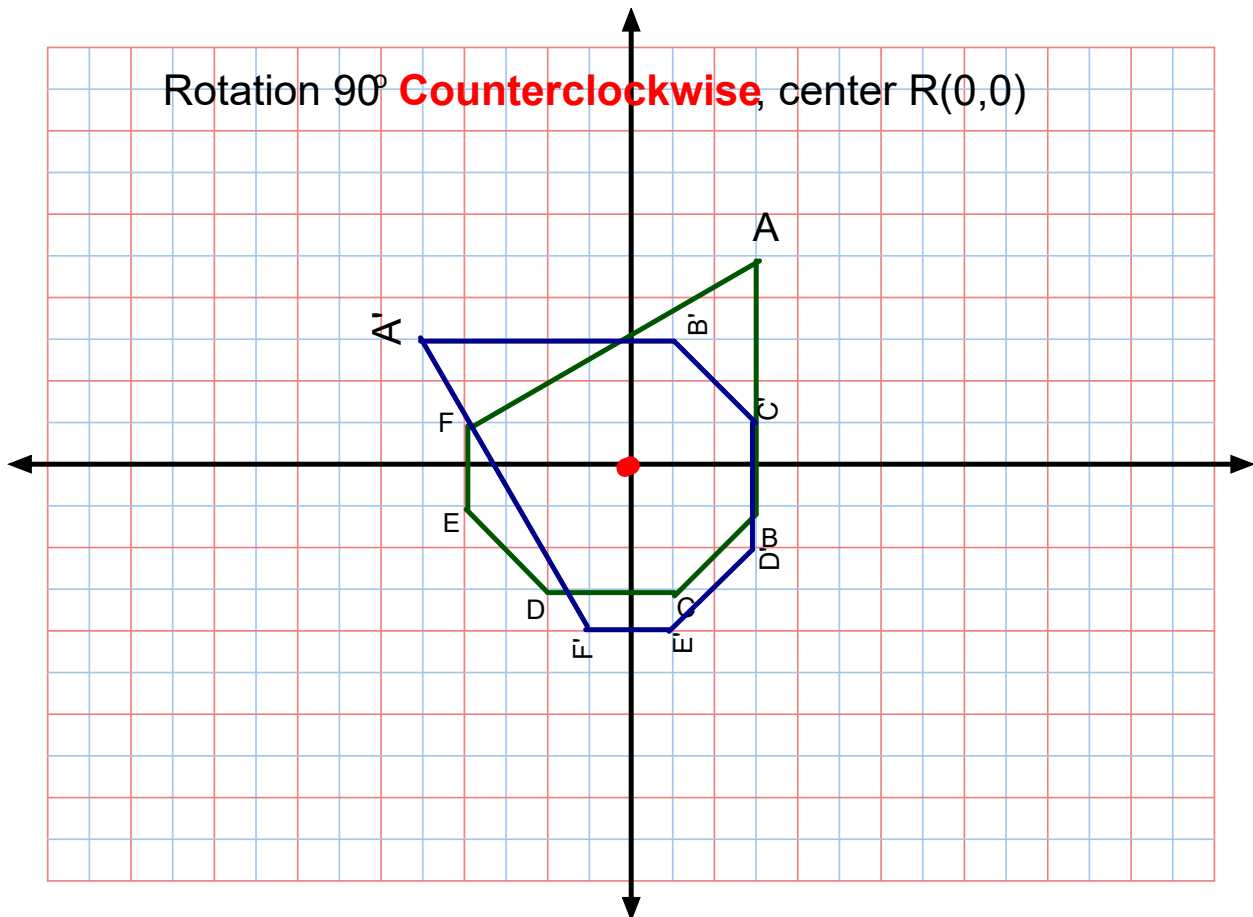
B'( , ) F'( , )

C( , )

C'( , )

D( , )

D'( , )



$A( 3, 5 )$   $E(-4,-1)$

$A'( -5 , 3 )$   $E'(1,-4)$

$B( 3,-1)$   $F(-4, 1 )$

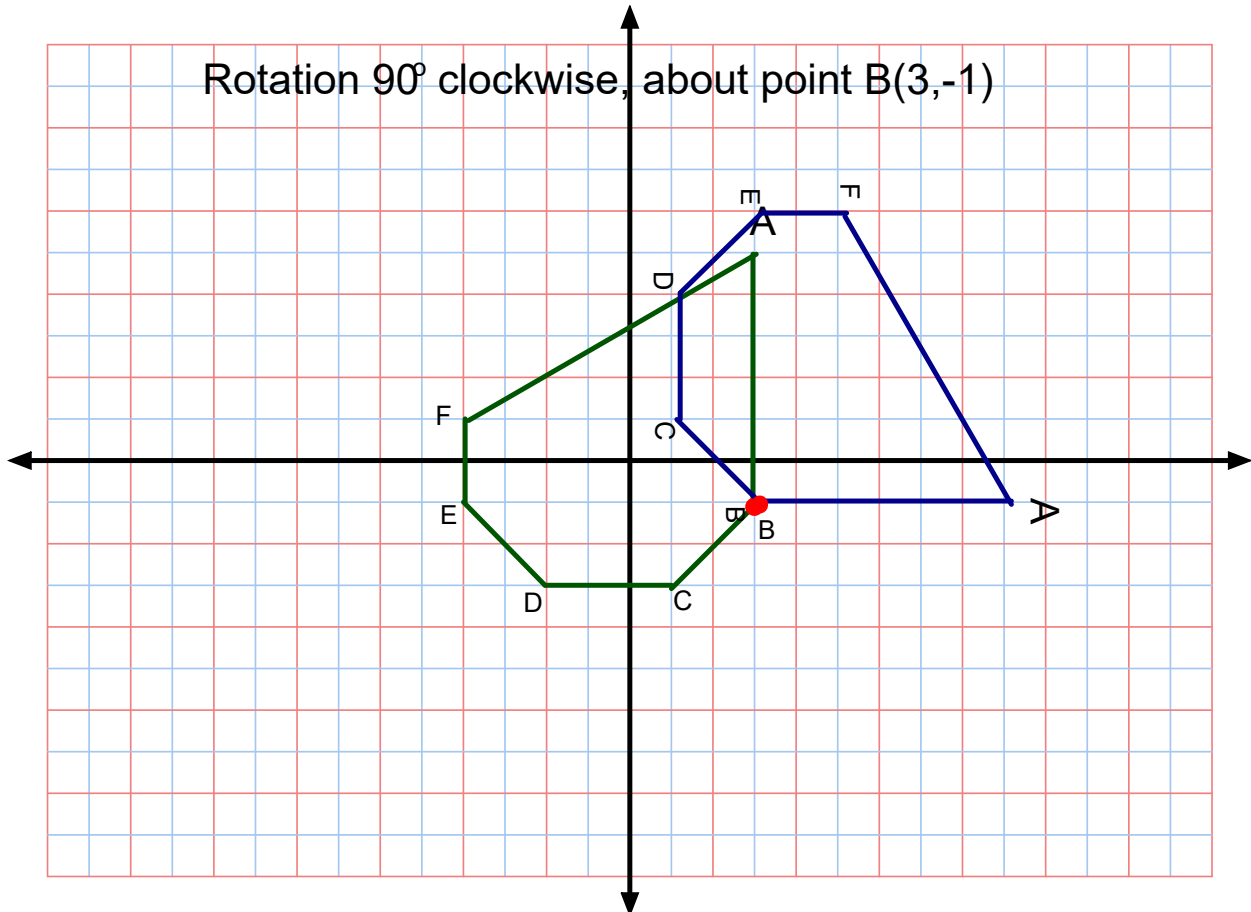
$B'( 1 , 3)$   $F'(-1,-4)$

$C( 1,-3 )$

$C'( 3 , 1)$

$D( -2,-3 )$

$D'( 3 , -2 )$



$A( \quad , \quad )$   $E( \quad , \quad )$

$A'( \quad , \quad )$   $E'( \quad , \quad )$

$B( \quad , \quad )$   $F( \quad , \quad )$

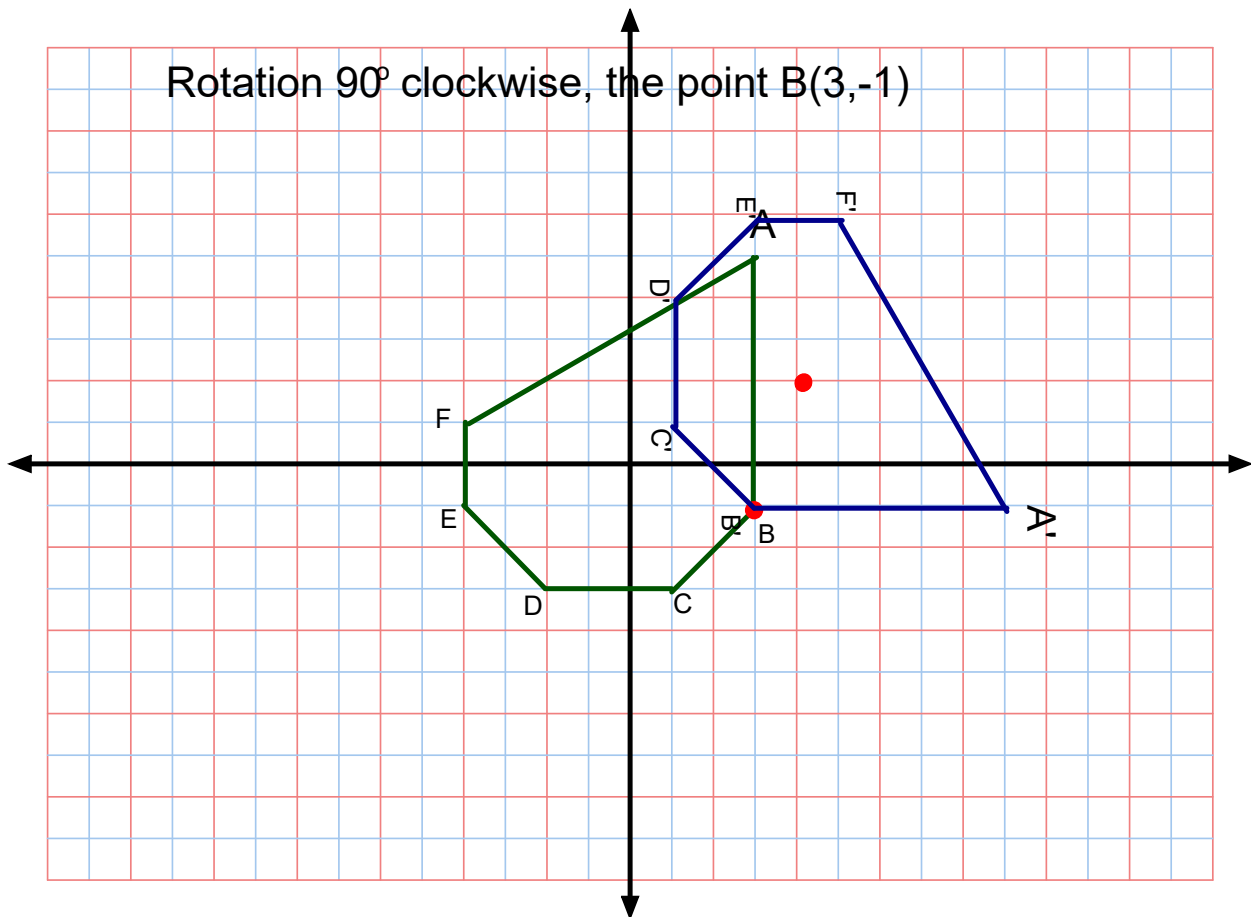
$B'( \quad , \quad )$   $F'( \quad , \quad )$

$C( \quad , \quad )$

$C'( \quad , \quad )$

$D( \quad , \quad )$

$D'( \quad , \quad )$



A( 3, 5 ) E(-4,-1)

A'( 9 , -1 ) E'(3,6)

B( 3,-1) F(-4, 1 )

B'( 3 , -1) F'(5,6)

C( 1,-3 )

C'( 1 , 1)

D( -2,-3 )

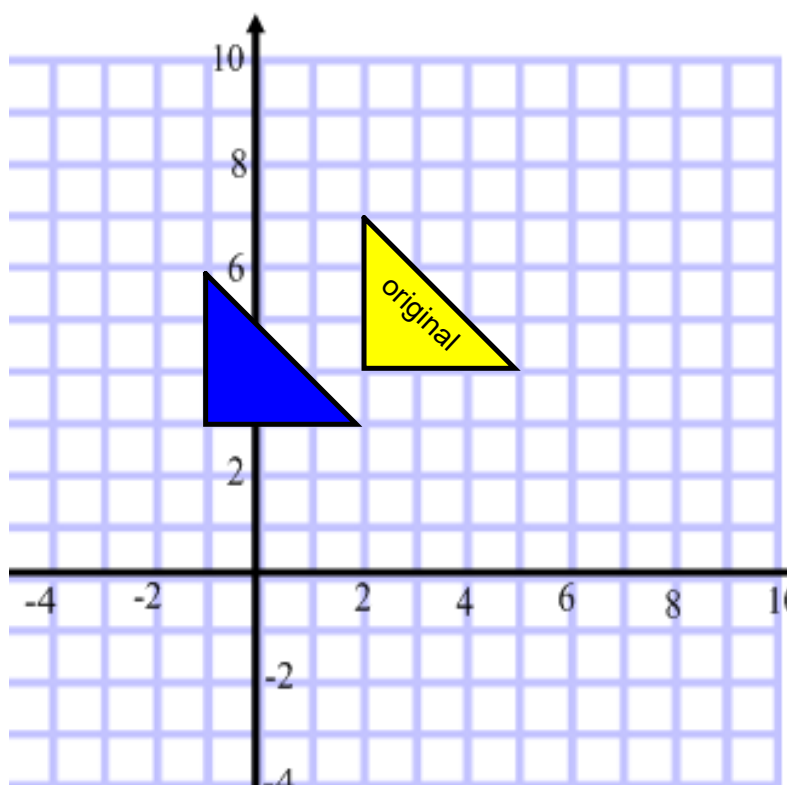
D'( 1 , 4 )



In Geometry, "Translation" simply means **Moving or Slide**

Every point of the shape must move:

- the **same distance**
- in the **same direction.**



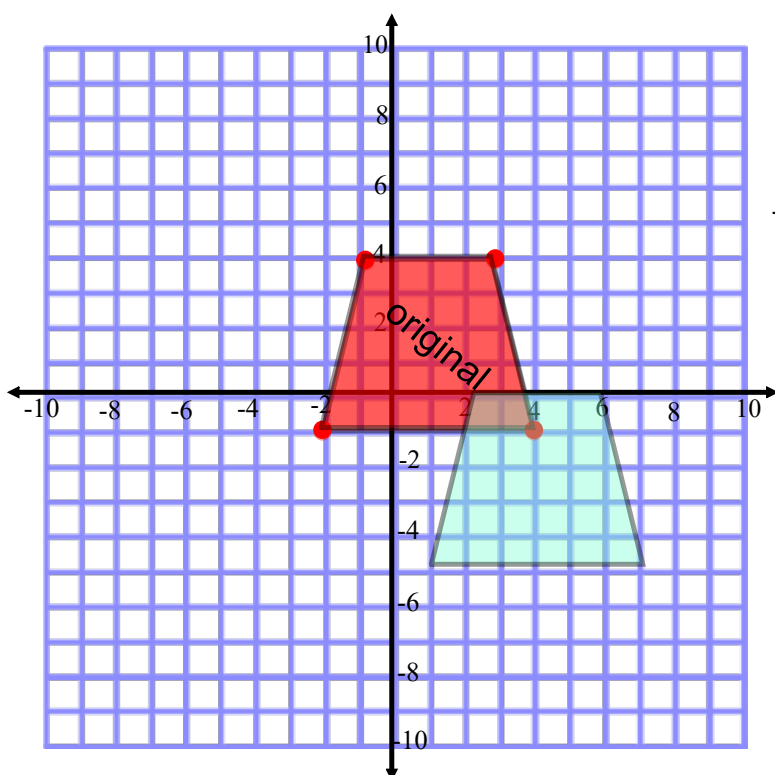
Translate the shape:

Left 3 units and 1 Unit  
Down

Notation:

L3 and D1





Translate the shape:  
Right 3 units and 4 Unit Down

Notation:  
 $T_{3, -4}$

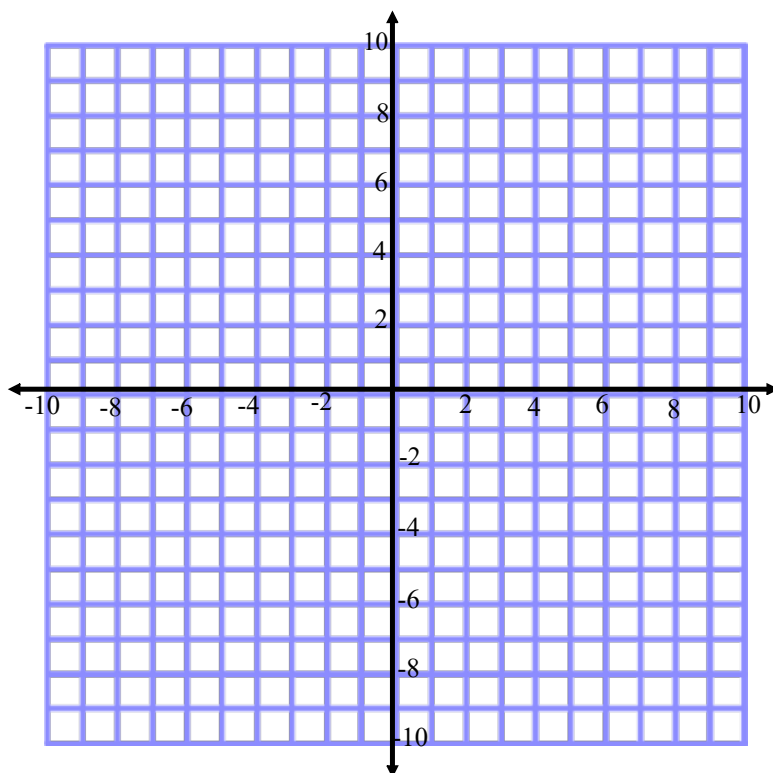
On grid paper plot the following points:

A (1, 3) B (3,1) and C (5,5)

Do the following Transformations:

1. A translation [slide] 2 units right and 2 units down of ABC.

2. A rotation of the triangle A'B'C' clockwise  $90^\circ$  about B'



On grid paper plot the following points:

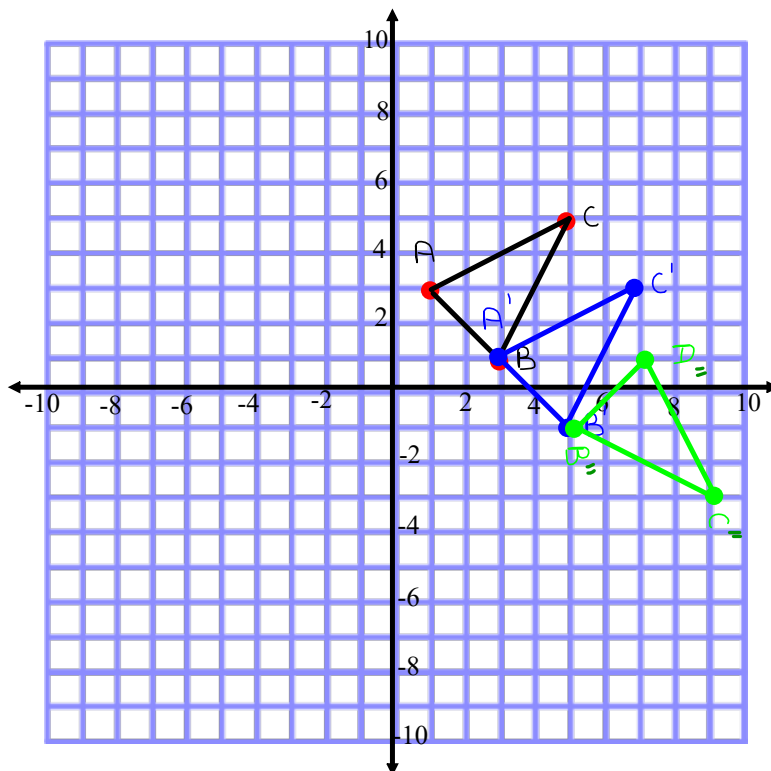
A (1, 3) B (3,1) and C (5,5)

Do the following Transformations:

1. A translation [slide] 2 units right and 2 units down of ABC.

Be careful

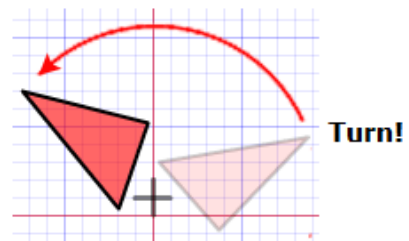
2. A rotation of the triangle A'B'C' clockwise  $90^\circ$  about B''



There are three types of transformations:

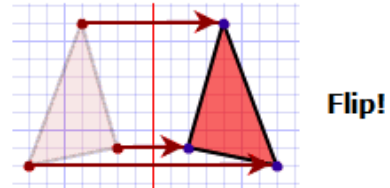
1. reflections [Line of reflection]

- Reflect through x-axis
- Reflect through y-axis
- \*oblique two coordinates



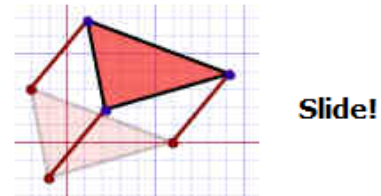
2. rotations

- order of rotation
- angle of rotation

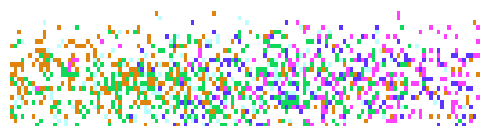


3. translations [slide]

- Left 3 up 2 [L3U2]
- right 4 down 2 [R4 D2]



# Class/Homework



-click on the "Homework" link on my teachers page for optional review questions

- If you have any questions you can contact me on the

Remind app

or

through email:

[melanie.burns@nbed.nb.ca](mailto:melanie.burns@nbed.nb.ca)



# Class/Homework

Page: 365 - 367



Questions: 4, 5, 6, 7,8

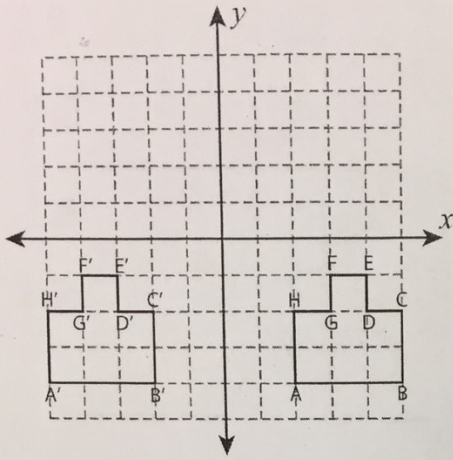
# 9, 10,13, 14a,15

&

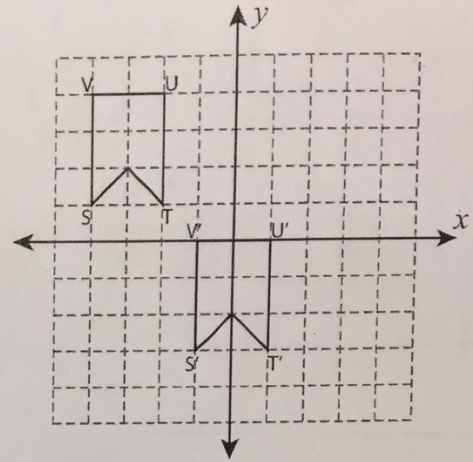
Translations Worksheets (See next slides)

Write a rule to describe each translation.

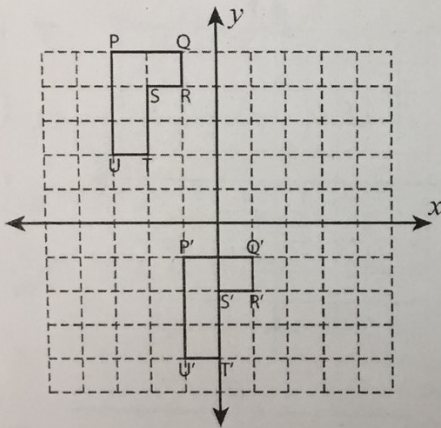
1)



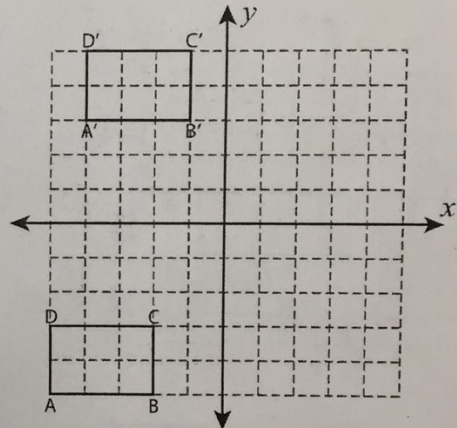
2)



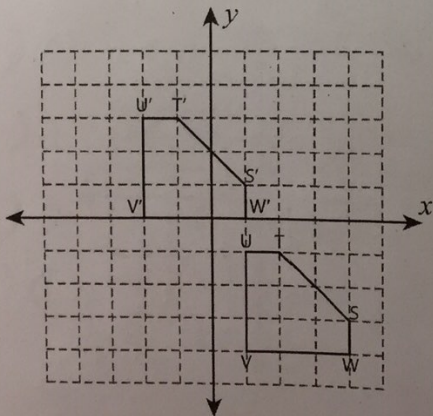
3)



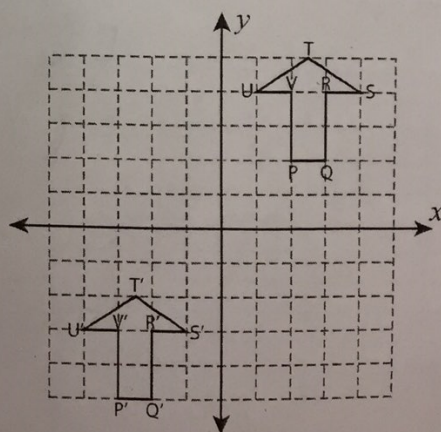
4)



5)



6)



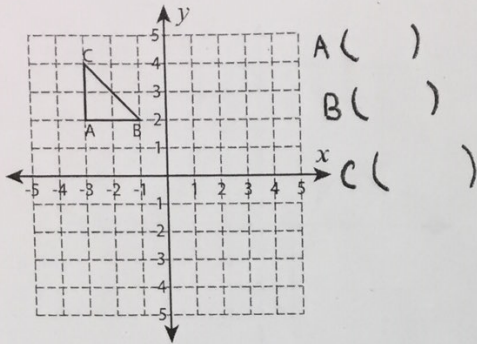


Write the New Coordinates

Sheet 1

Graph the image of each figure after the given translation. Also write the coordinates of the image.

1) 1 unit down and 4 units right

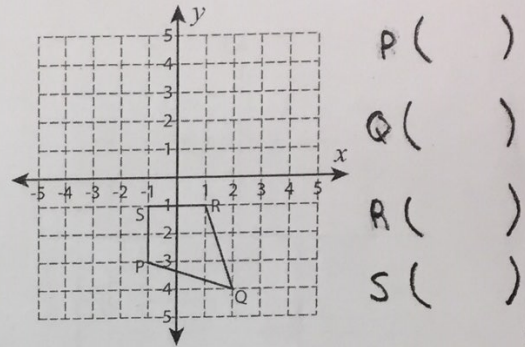


A ( )  
B ( )  
C ( )

A': \_\_\_\_\_, B': \_\_\_\_\_

C': \_\_\_\_\_

2) 2 units right and 5 units up

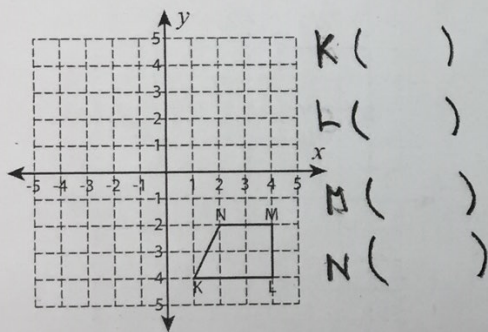


P ( )  
Q ( )  
R ( )  
S ( )

P': \_\_\_\_\_, Q': \_\_\_\_\_

R': \_\_\_\_\_, S': \_\_\_\_\_

3) 6 units up and 6 units left

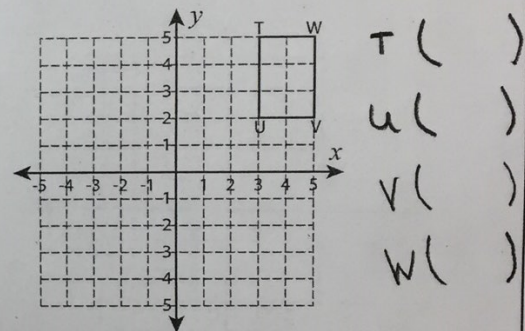


K ( )  
L ( )  
M ( )  
N ( )

K': \_\_\_\_\_, L': \_\_\_\_\_

M': \_\_\_\_\_, N': \_\_\_\_\_

4) 8 units left and 7 units down

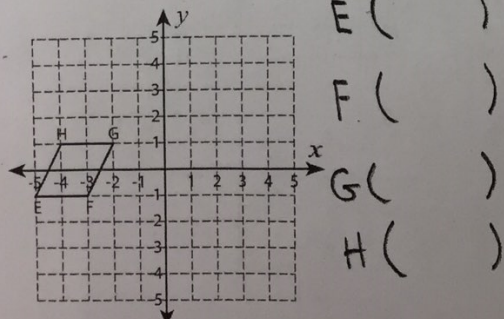


T ( )  
U ( )  
V ( )  
W ( )

T': \_\_\_\_\_, U': \_\_\_\_\_

V': \_\_\_\_\_, W': \_\_\_\_\_

5) 7 units right

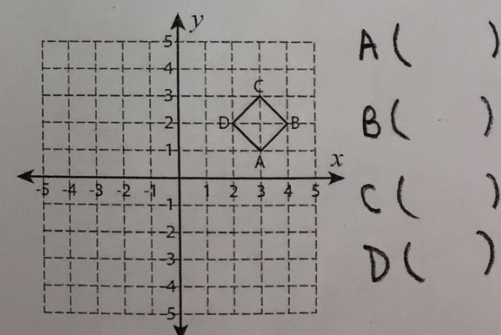


E ( )  
F ( )  
G ( )  
H ( )

E': \_\_\_\_\_, F': \_\_\_\_\_

G': \_\_\_\_\_, H': \_\_\_\_\_

6) 4 units down and 6 units left



A ( )  
B ( )  
C ( )  
D ( )

A': \_\_\_\_\_, B': \_\_\_\_\_

C': \_\_\_\_\_, D': \_\_\_\_\_

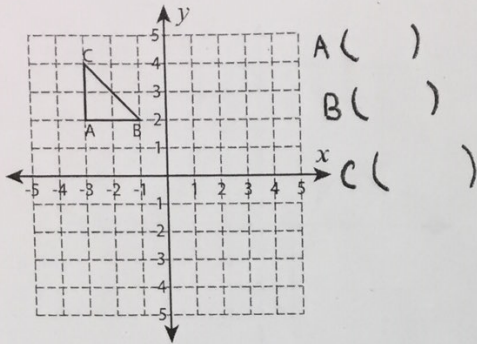


Write the New Coordinates

Sheet 1

Graph the image of each figure after the given translation. Also write the coordinates of the image.

1) 1 unit down and 4 units right

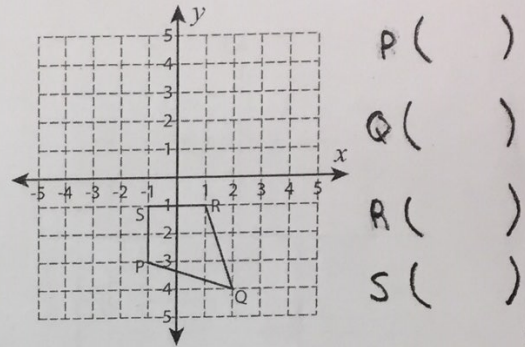


A ( )  
B ( )  
C ( )

A': \_\_\_\_\_, B': \_\_\_\_\_

C': \_\_\_\_\_

2) 2 units right and 5 units up

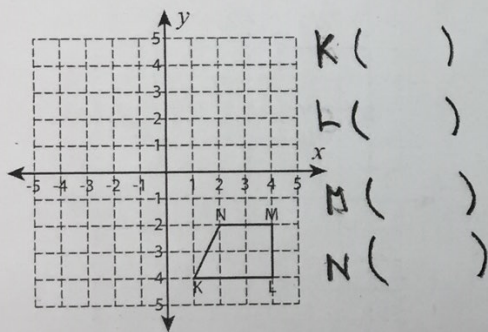


P ( )  
Q ( )  
R ( )  
S ( )

P': \_\_\_\_\_, Q': \_\_\_\_\_

R': \_\_\_\_\_, S': \_\_\_\_\_

3) 6 units up and 6 units left

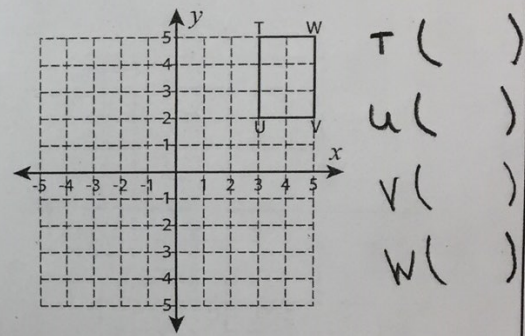


K ( )  
L ( )  
M ( )  
N ( )

K': \_\_\_\_\_, L': \_\_\_\_\_

M': \_\_\_\_\_, N': \_\_\_\_\_

4) 8 units left and 7 units down

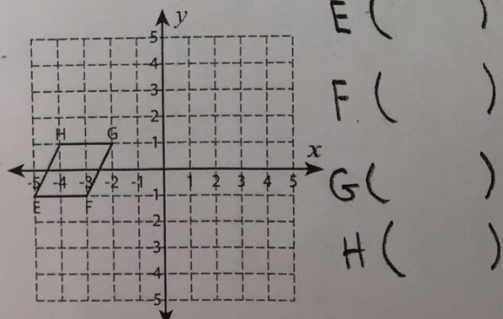


T ( )  
U ( )  
V ( )  
W ( )

T': \_\_\_\_\_, U': \_\_\_\_\_

V': \_\_\_\_\_, W': \_\_\_\_\_

5) 7 units right

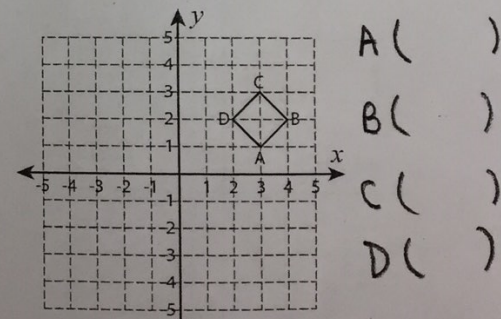


E ( )  
F ( )  
G ( )  
H ( )

E': \_\_\_\_\_, F': \_\_\_\_\_

G': \_\_\_\_\_, H': \_\_\_\_\_

6) 4 units down and 6 units left



A ( )  
B ( )  
C ( )  
D ( )

A': \_\_\_\_\_, B': \_\_\_\_\_

C': \_\_\_\_\_, D': \_\_\_\_\_