Teacher Lesson Plan

Lesson: **Day 5 – Supplement Lesson**
Graphing and Describing 180 ° Rotations about the Origin (0, 0)

CC Standards

8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

Objective

TSW… Graph and Describe 180° rotations about the origin.

Mathematical Practices

#1 Make sense of problems and persevere in solving them.
#6 Attend to precision.
#7 Look for and make use of structure.
#8 Look for and express regularity in repeated reasoning.

Note to teachers:

Be sure to teach this lesson from the PowerPoint, not the student notes. You will be missing part of the lesson otherwise.

Teacher Input

Bellwork: Review bellwork.
Homework: Review important problems assigned the previous night.
Introduction: Introduce as directed on the PowerPoint.
Lesson: Teach as directed in the PowerPoint. Be sure to look at the notes on each slide for additional instruction and answers.

Practice

Homework

Click on each link below to watch a YouTube video that explains how to graph using rules (around origin).

180 degree rotations (3:58) https://www.youtube.com/watch?v=8ZeeDYIlNFk
90 degree clockwise rotations (13:33) https://www.youtube.com/watch?v=LwGmA9F3hbw
90 degree CCW rotations (12:57) https://www.youtube.com/watch?v=4Q70ZHVFKPc

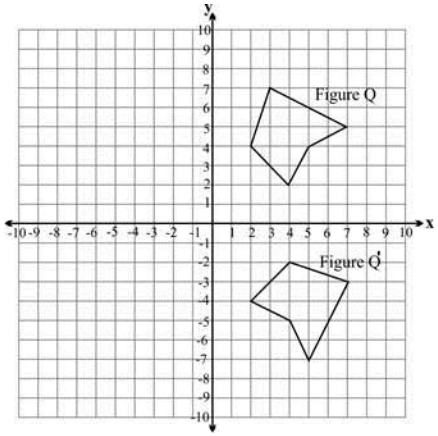
Note… The above videos are included in the PowerPoint so that you can show them to your students if you are able to. The last two videos are longer. There is a portion at the end of the video that you can skip if necessary.

All 3 rotations: https://www.youtube.com/watch?v=9dSnm6CSoSs
Note…This video can be shown on a Review Day.

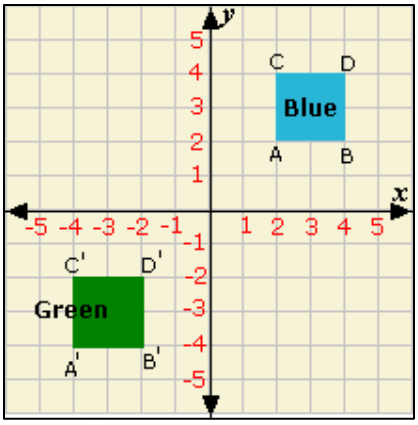
Section 1: Describing Rotations

You Try #1

Describe the given rotation.
Give both the CW and CCW description.



You Try #2



Which of the following could map the Blue square onto the Green?

A) Reflection across the x-axis.

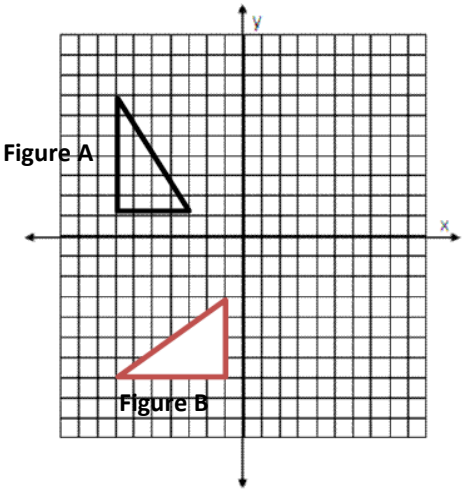
B) 180° rotation around the origin.

C) A translation 6 left and 6 down.

D) Both B and C.

You Try #3

Describe the given rotation.
Give both the CW and CCW description.



You Try #4

Which describes the rotation of the cell phone?

Select ALL that apply.

A. 90° clockwise

B. 180° clockwise

C. 270° clockwise

D. 90° counter clockwise

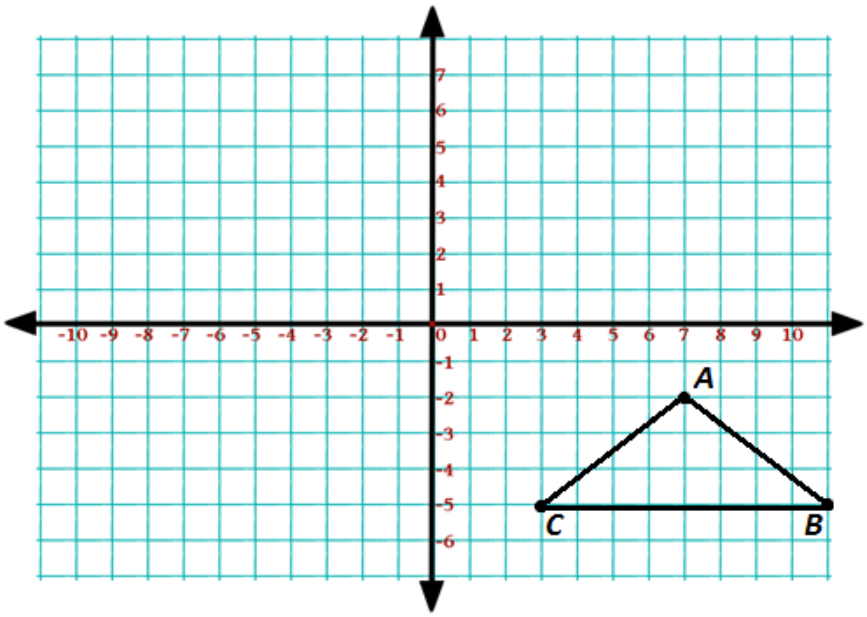
E. 180° counter clockwise

F. 270° counter clockwise

Section 2: Rotating 180° about the Origin

Guided Practice

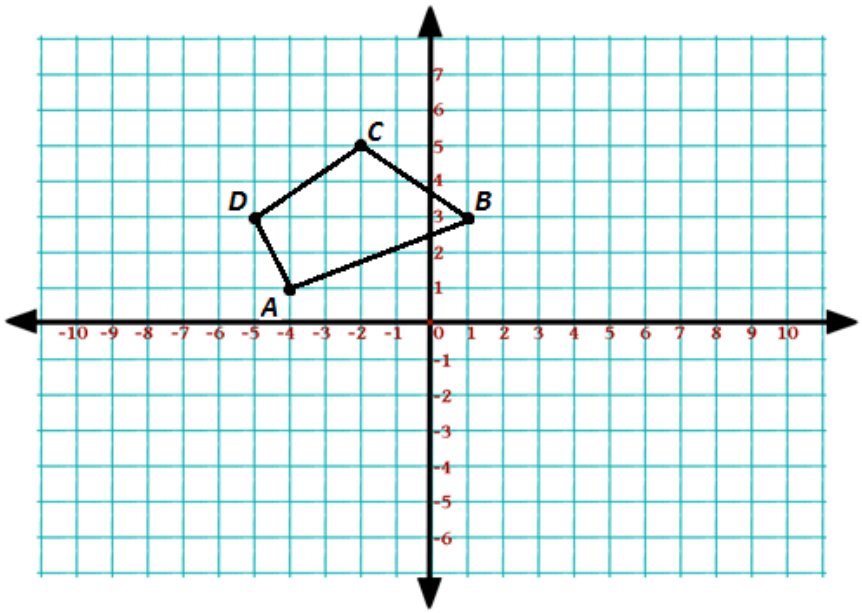
Rotate ΔABC 180° clockwise.



Pre-image	Image

You Try

Rotate ΔABCD 180° clockwise.



Pre-image	Image

Using RULES to Rotate 180° about the Origin

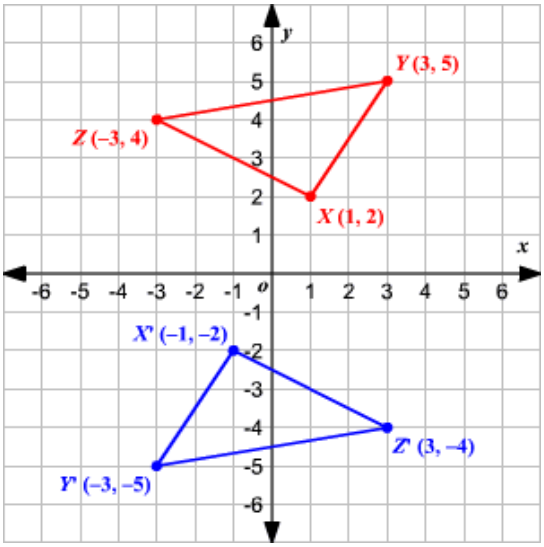
RULE:

- **Keep the same coordinates;**
- **Change both signs to the opposite.**

(x, y) → (-x, -y)

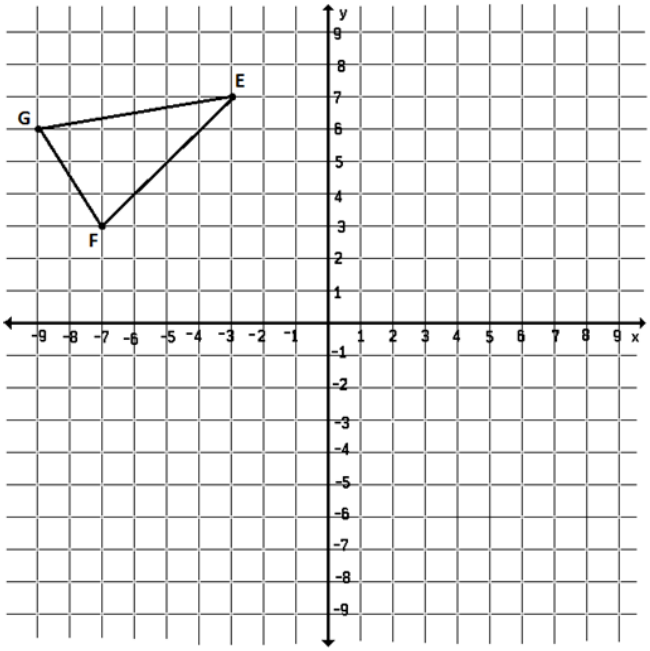
EXAMPLE:

Pre-image	Image
X(1, 2)	X'(-1, -2)
Y(3, 5)	Y'(-3, -5)
Z(-3, 4)	Z'(3, -4)



Guided Practice

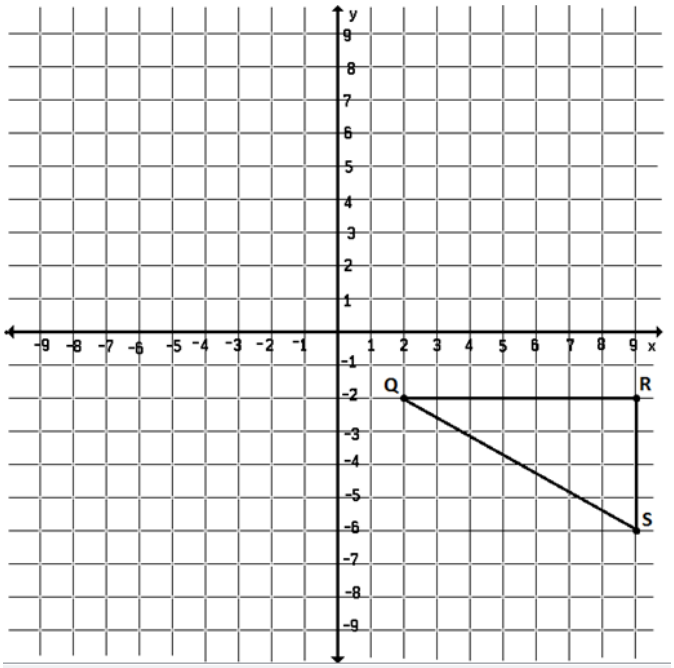
Rotate ΔEFG 180º clockwise using RULES.



Pre-image	Image

You Try

Rotate ΔQRS 180º clockwise using RULES.



Pre-image	Image

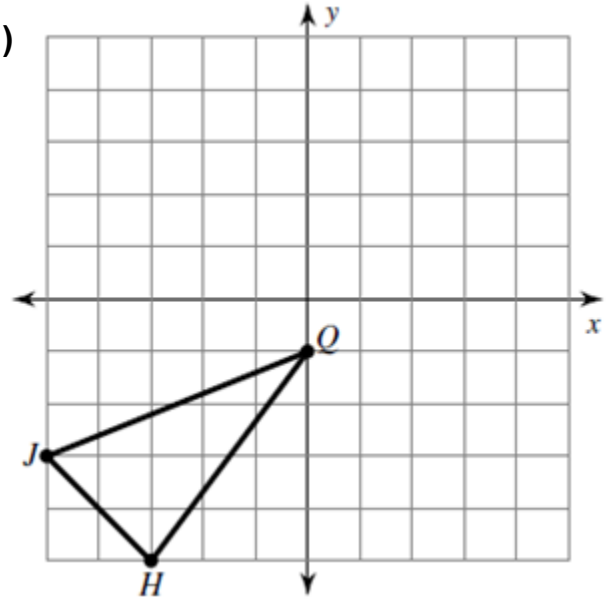
Classwork

Name_____ **Date**_____ **Period** ____

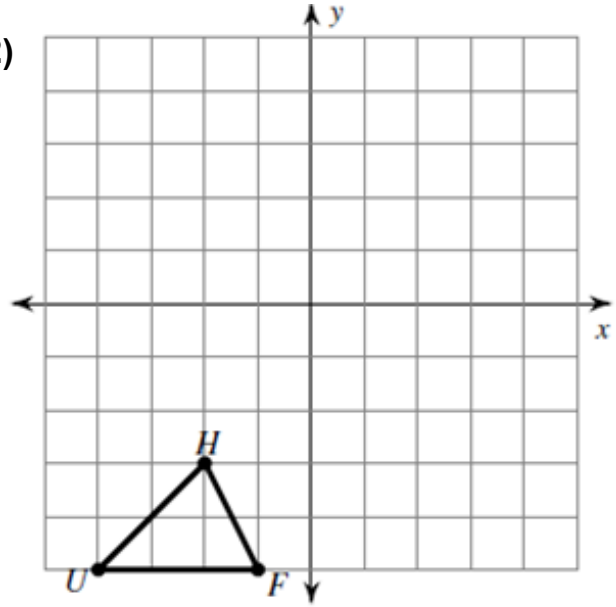
180° Rotations

Rotate each pre-image below 180 degrees. Name the coordinates after each rotation.

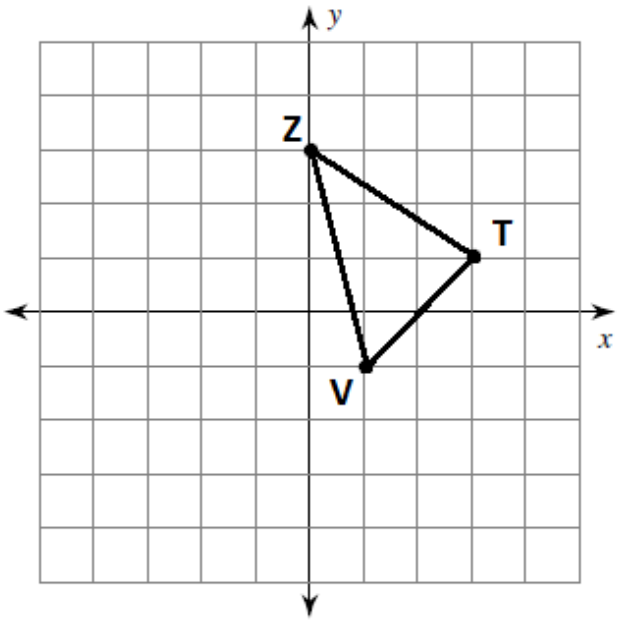
1)



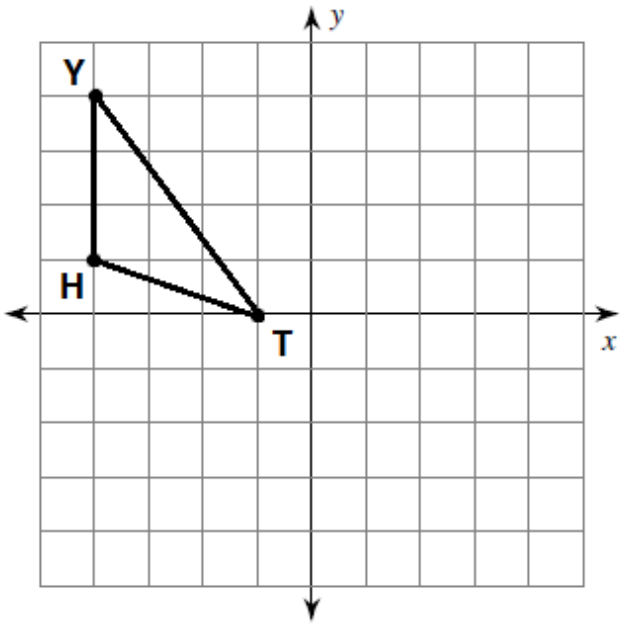
2)



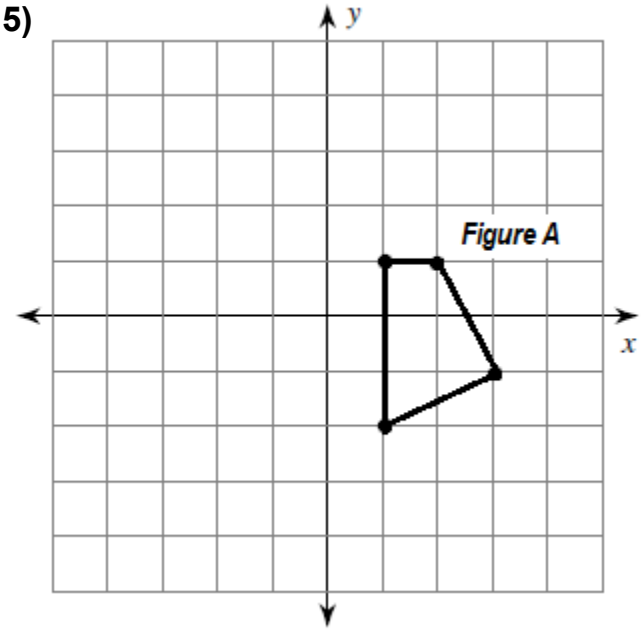
3)



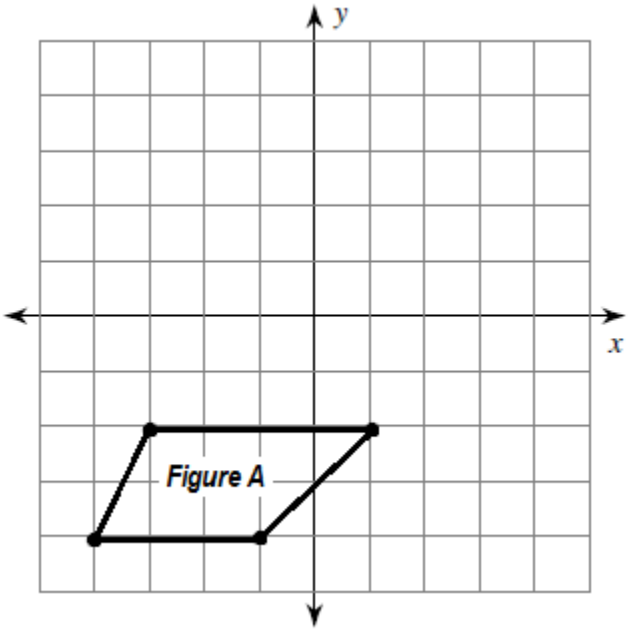
4)



5)



6)



Homework

Name_____ **Date**_____ **Period**_____

1) Use the coordinate plane given below to answer the following:

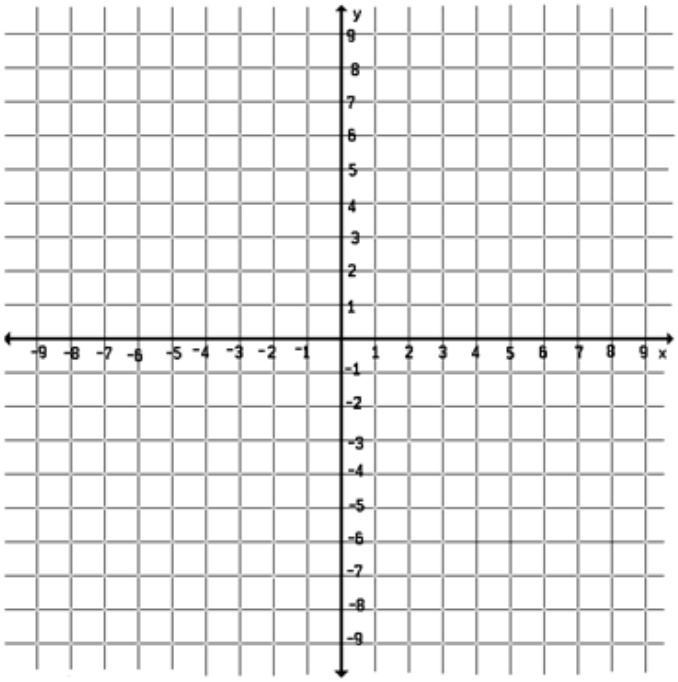
Part A: **Graph a triangle with the points:** **A(3, 7) B(8, 5) C(9, -4)**

Part B: **Take the triangle from Part A and rotate it 180° counter-clockwise.**

Part C: **What are the coordinates of the new image?**

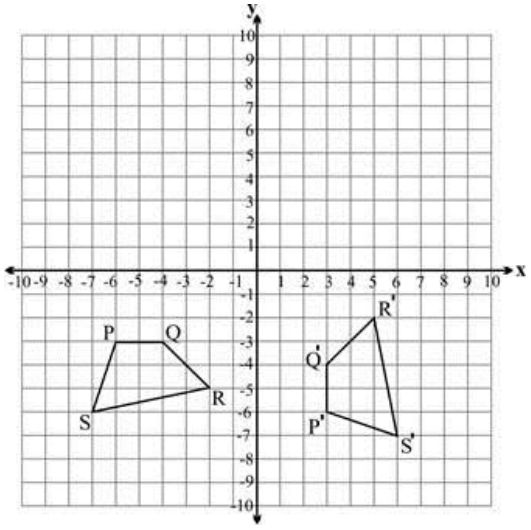
New Image

A'(,)
B'(,)
C'(,)



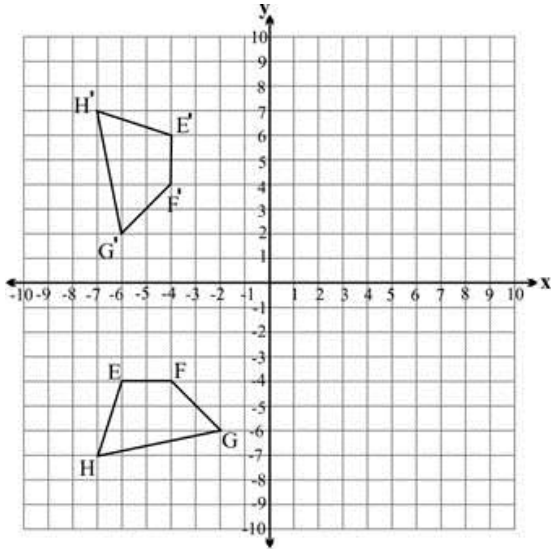
Describe each rotation by its clockwise rotation and its counter-clockwise rotation.

2)



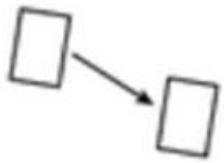
Clockwise: _____°
Counter-clockwise: _____°

3)



Clockwise: _____°
Counter-clockwise: _____°

4) Describe each transformation as a translation, reflection, or rotation. If it is a reflection, name the line of reflection. If it is a rotation, name the direction as clockwise or counter-clockwise.



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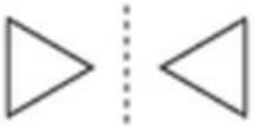

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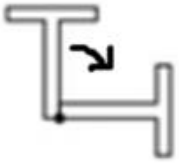

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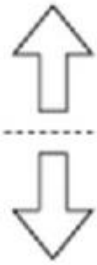

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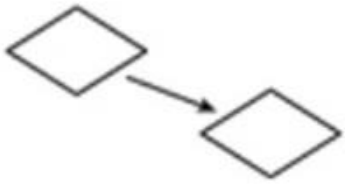

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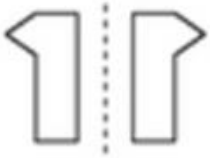

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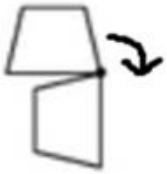

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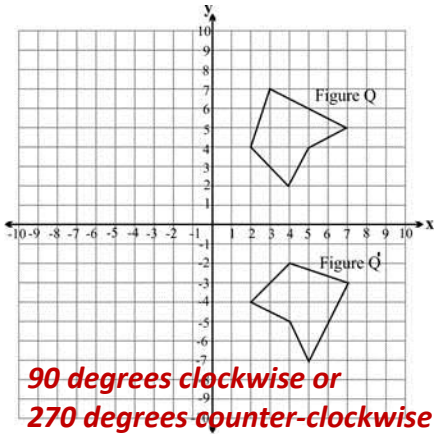
Answer Key

Section 1: Describing Rotations

Student Notes

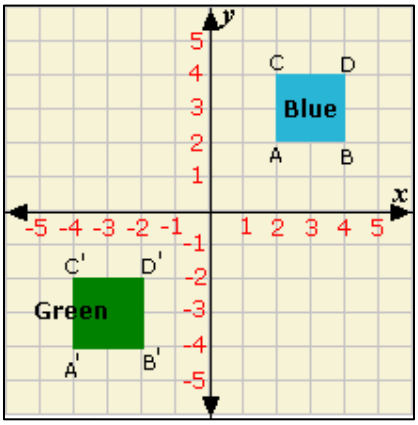
You Try #1

Describe the given rotation.
Give both the CW and CCW description.



90 degrees clockwise or
270 degrees counter-clockwise

You Try #2



Which of the following could map the Blue square onto the Green?

A) Reflection across the x-axis.

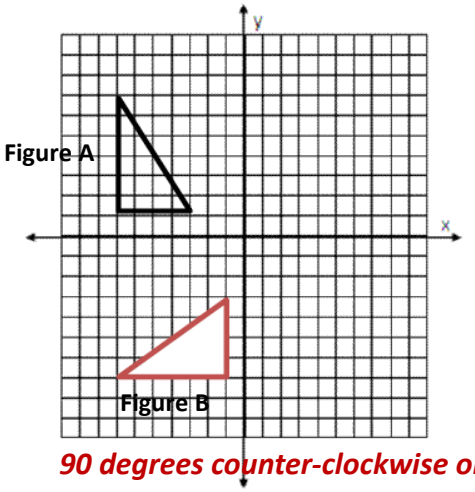
B) 180° rotation around the origin.

C) A translation 6 left and 6 down.

D) Both B and C.

You Try #3

Describe the rotation from A to B.
Give both the CW and CCW description.



90 degrees counter-clockwise or
270 degrees clockwise

You Try #4

Which describes the rotation of the cell phone?

Select ALL that apply.

A. 90° clockwise

B. 180° clockwise

C. 270° clockwise

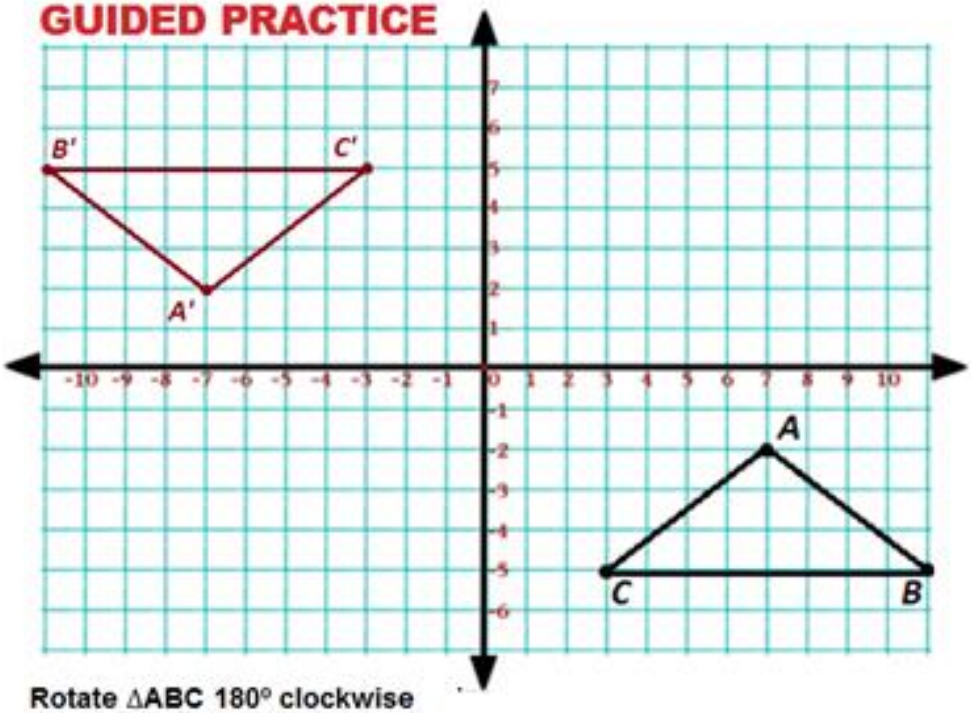
D. 90° counter-clockwise

E. 180° counter-clockwise

F. 270° counter-clockwise

Section 2: Rotating 180° about the Origin

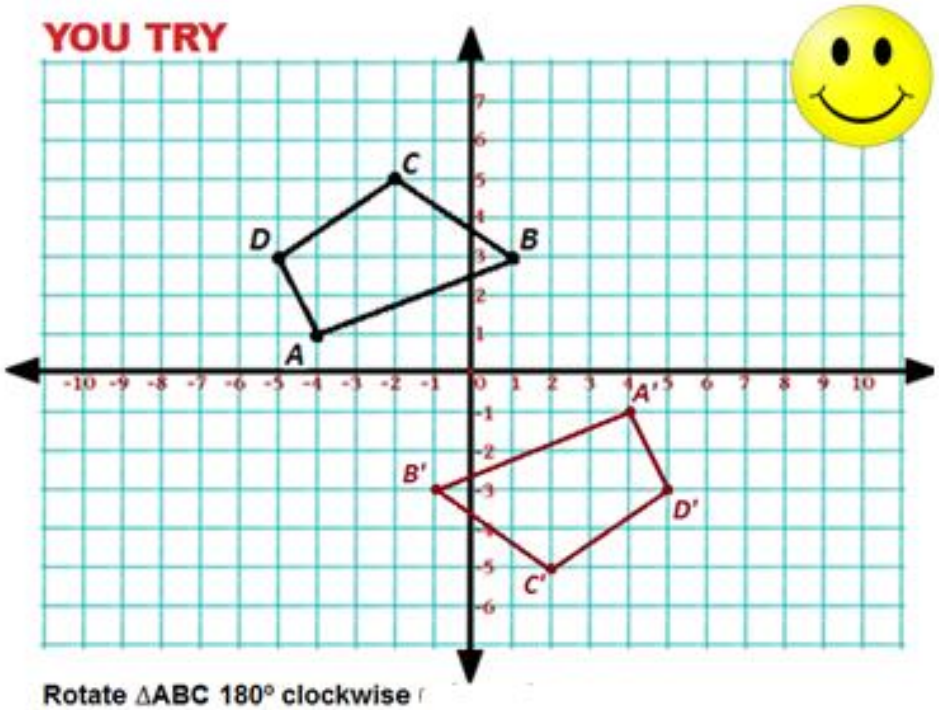
GUIDED PRACTICE



Rotate ΔABC 180° clockwise

Preimage	Image
A(7, -2)	A′(-7, 2)
B(11, -5)	B′(-11, 5)
C(3, -5)	C′(-3, 5)

YOU TRY



Rotate ΔABC 180° clockwise

Preimage	Image
A(-4, 1)	A′(4, -1)
B(1, 3)	B′(-1, -3)
C(-2, 5)	C′(2, -5)
D(-5, 3)	D′(5, -3)

Using RULES to Rotate 180° about the Origin

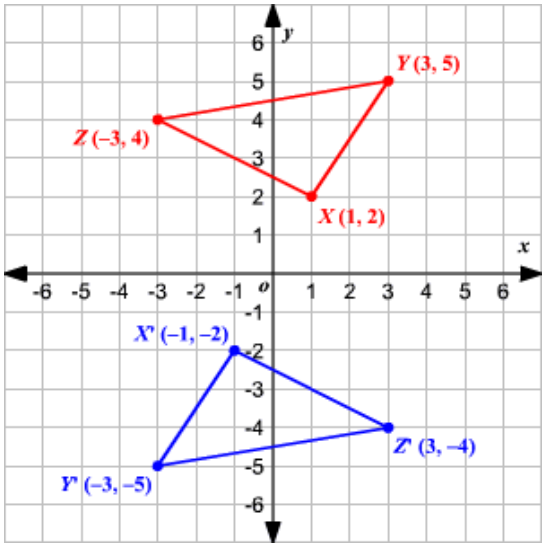
RULE:

- **Keep the same coordinates;**
- **Change both signs to the opposite.**

(x, y) → (-x, -y)

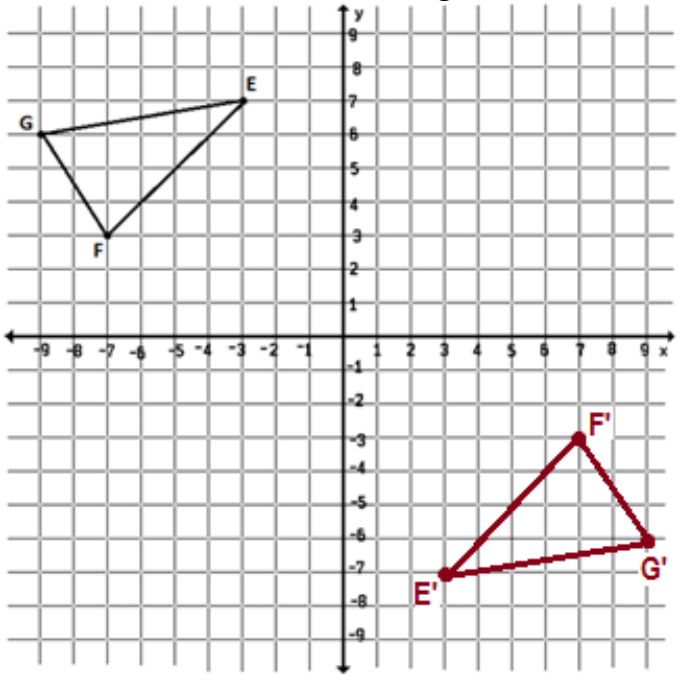
EXAMPLE:

Pre-image	Image
X(1, 2)	X'(-1, -2)
Y(3, 5)	Y'(-3, -5)
Z(-3, 4)	Z'(3, -4)



Guided Practice

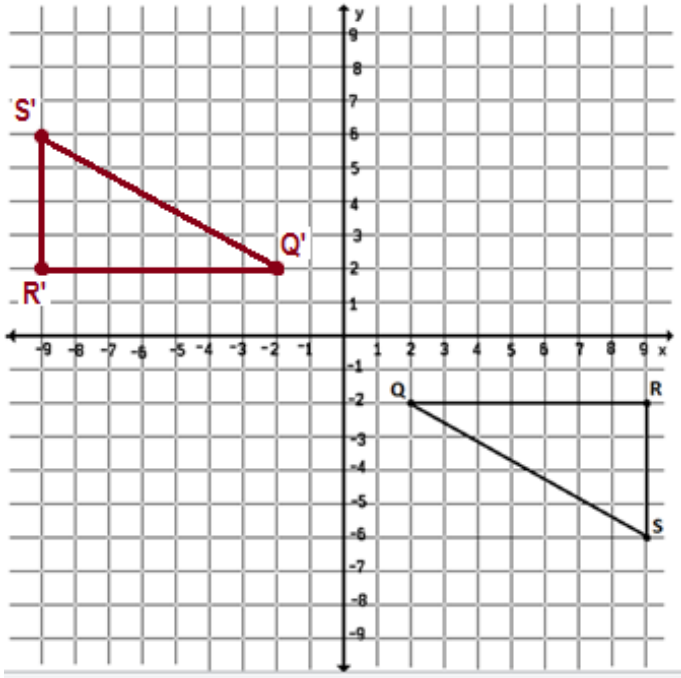
Rotate ΔEFG 180º clockwise using RULES.



Pre-image	Image
E(-3, 7)	E'(3, -7)
F(-7, 3)	F'(7, -3)
G(-9, 6)	G'(9, -6)

You Try ☺

Rotate ΔQRS 180º clockwise using RULES.



Pre-image	Image
Q(2, -2)	Q'(-2, 2)
R(9, -2)	R'(-9, 2)
S(9, -6)	S'(-9, 6)

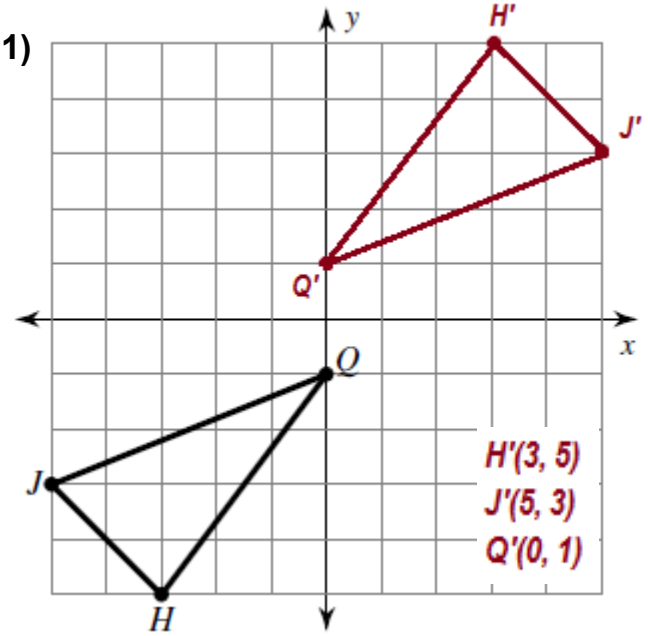
Classwork

Name_____ **Date**_____ **Period** ____

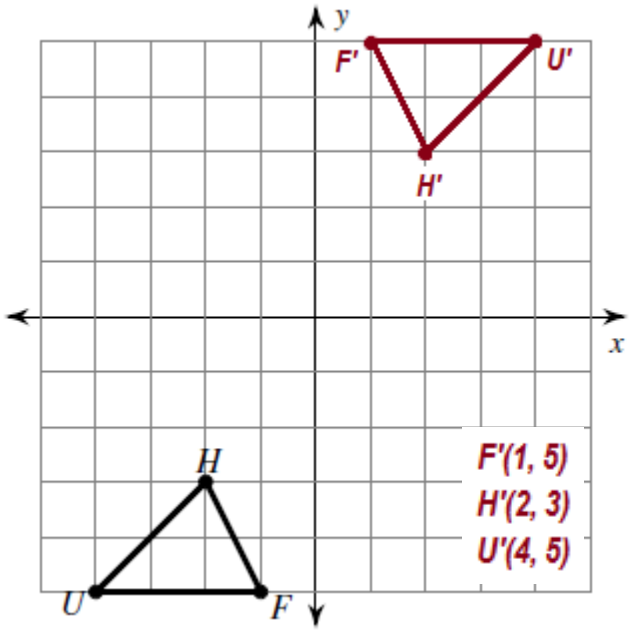
180° Rotations

Rotate each pre-image below 180 degrees. Name the coordinates after each rotation.

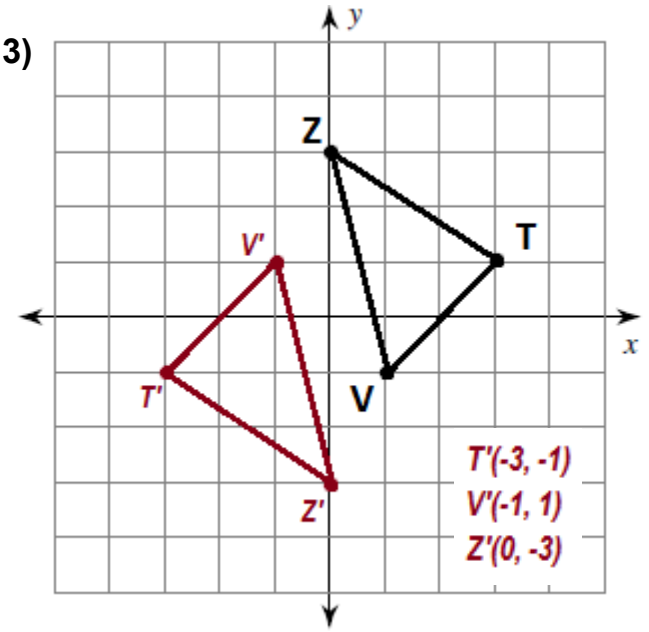
1)



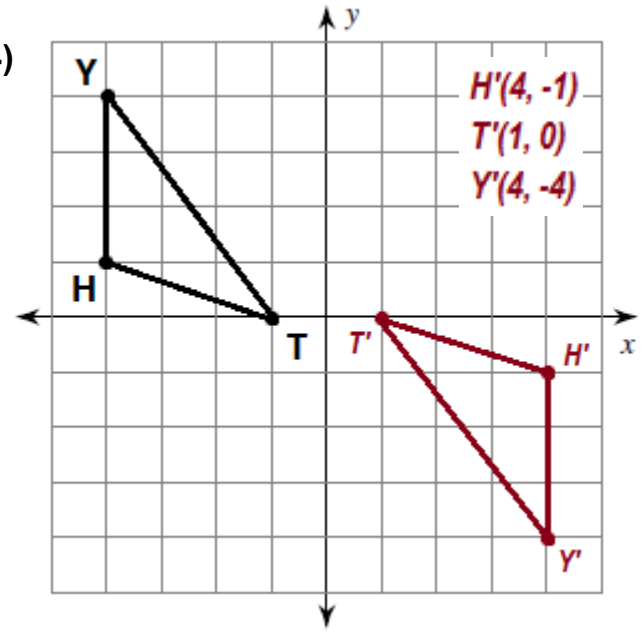
2)



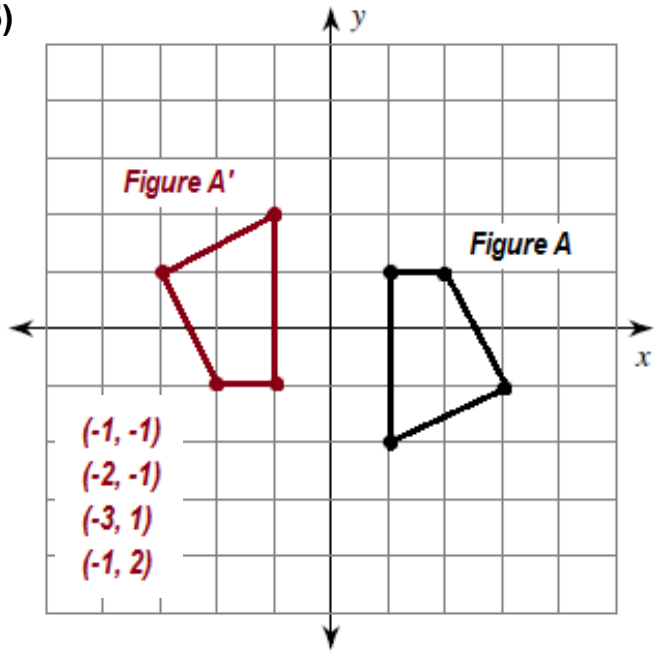
3)



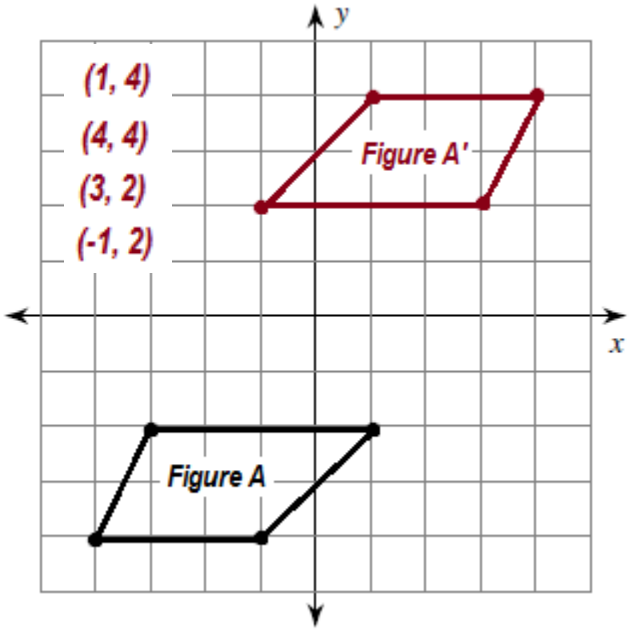
4)



5)



6)



Homework

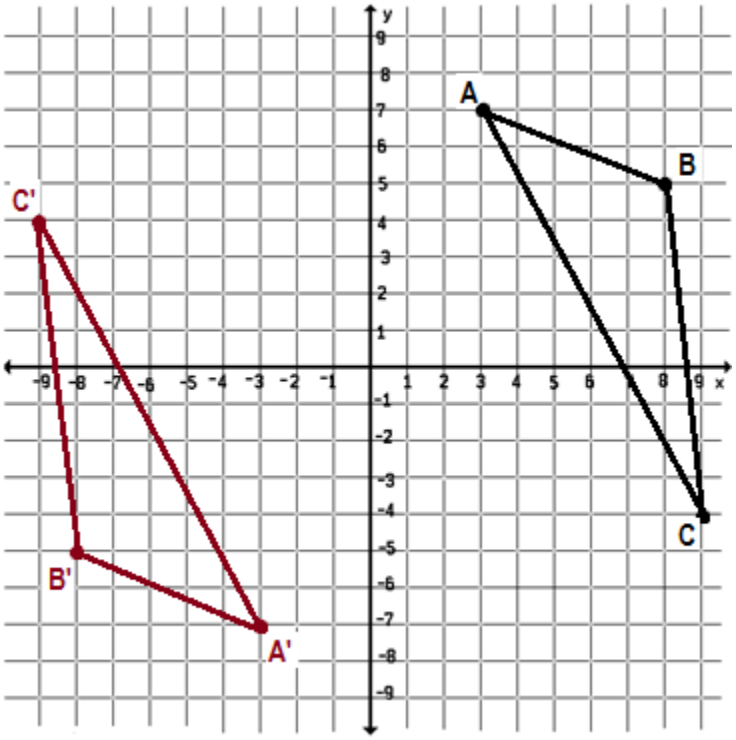
Name_____ **Date**_____ **Period**_____

1) Use the coordinate plane given below to answer the following:

Part A: **Graph a triangle with the points:** **A(3, 7) B(8, 5) C(9, −4)**

Part B: **Take the triangle from Part A and rotate it 180° counter-clockwise.**

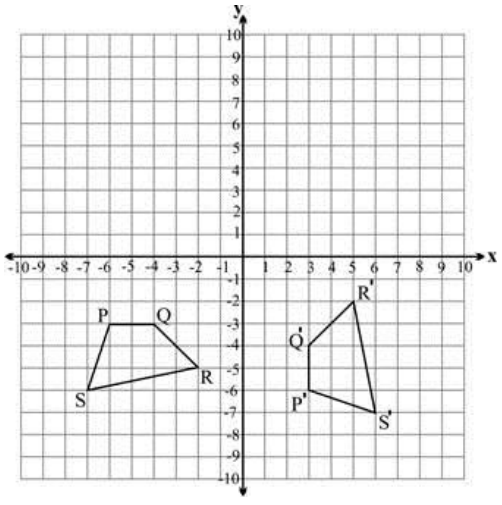
Part C: **What are the coordinates of the new image?**



New Image
$A'(-3,-7)$
$B'(-8,-5)$
$C'(-9,4)$

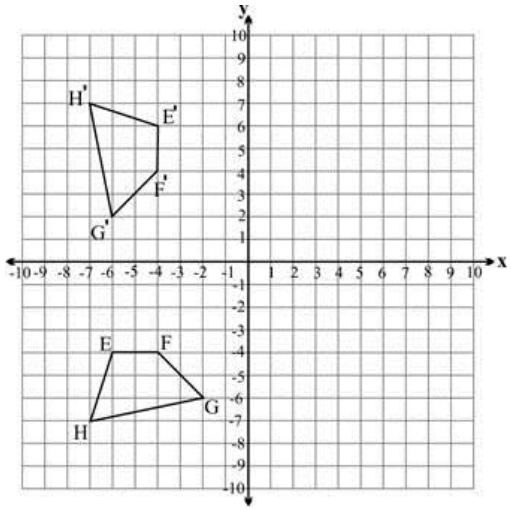
Describe each rotation by its clockwise rotation and its counter-clockwise rotation.

1)



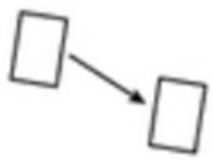
Clockwise: 270°
Counter-clockwise: 90°

2)

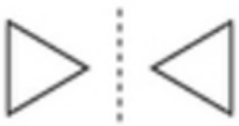


Clockwise: 90°
Counter-clockwise: 270°

3) Describe each transformation as a translation, reflection, or rotation. If it is a reflection, name the line of reflection. If it is a rotation, name the direction as clockwise or counter-clockwise.

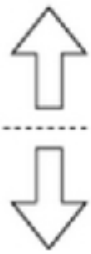


translation



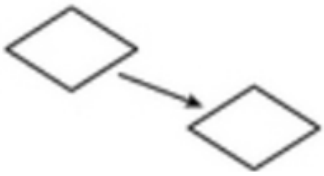
reflection over y-axis

rotation clockwise



reflection over x-axis

rotation counter-clockwise



translation

rotation counter-clockwise

reflection over y-axis

rotation clockwise