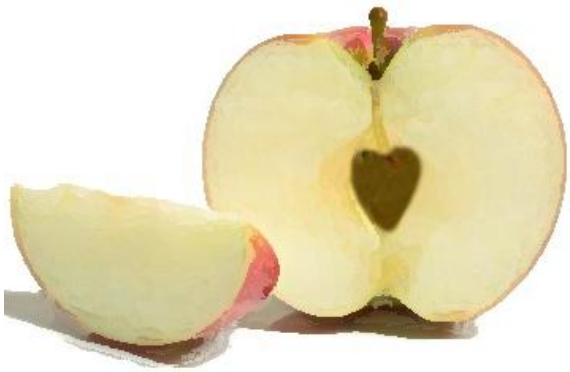

Getting to the Core

Geometry

Unit 1 - Basic Definitions & Rigid Motions

Updated on May 3, 2013

Student Name _____ Period _____

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Unit 1 – Basic Definitions & Rigid Motions

Table of Contents

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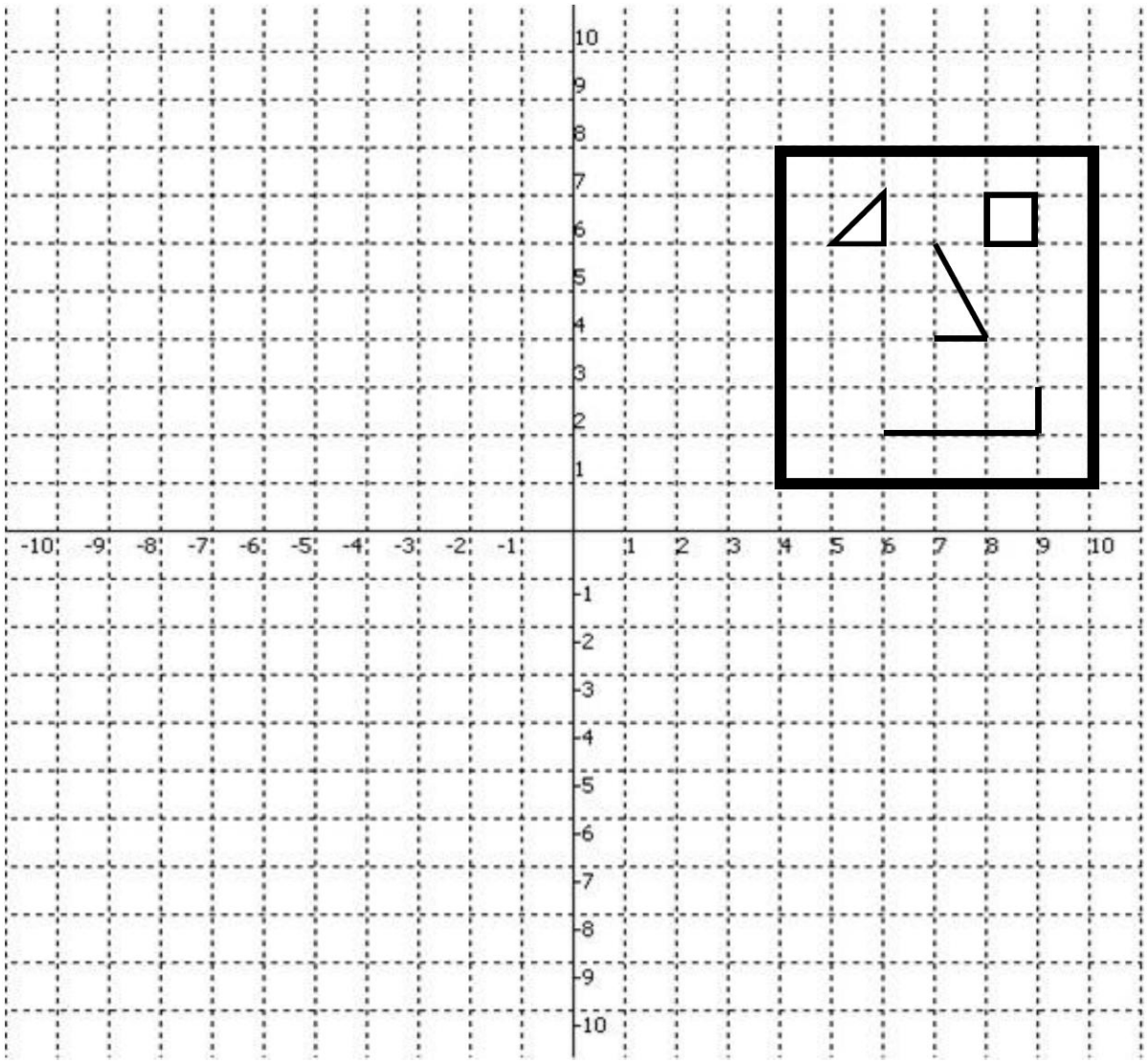
Hook: Transformations: Task 1



Coordinates of image (x, y)

Outline: (4,1), (4,8), (10,8), (10,1)

Mouth: (9,3), (9,2) (6,2)

Nose: (7,6), (8,4), (7,4)

Left Eye: (5,6), (6,6), (6,7)

Right Eye: (8,6), (8,7), (9,7), (9,6)

In your team, for each order pair provided on the left, transform the face by applying the following rule to each point

$x' = -x$

$y' = y$

Coordinates of new image (x', y')

Outline:

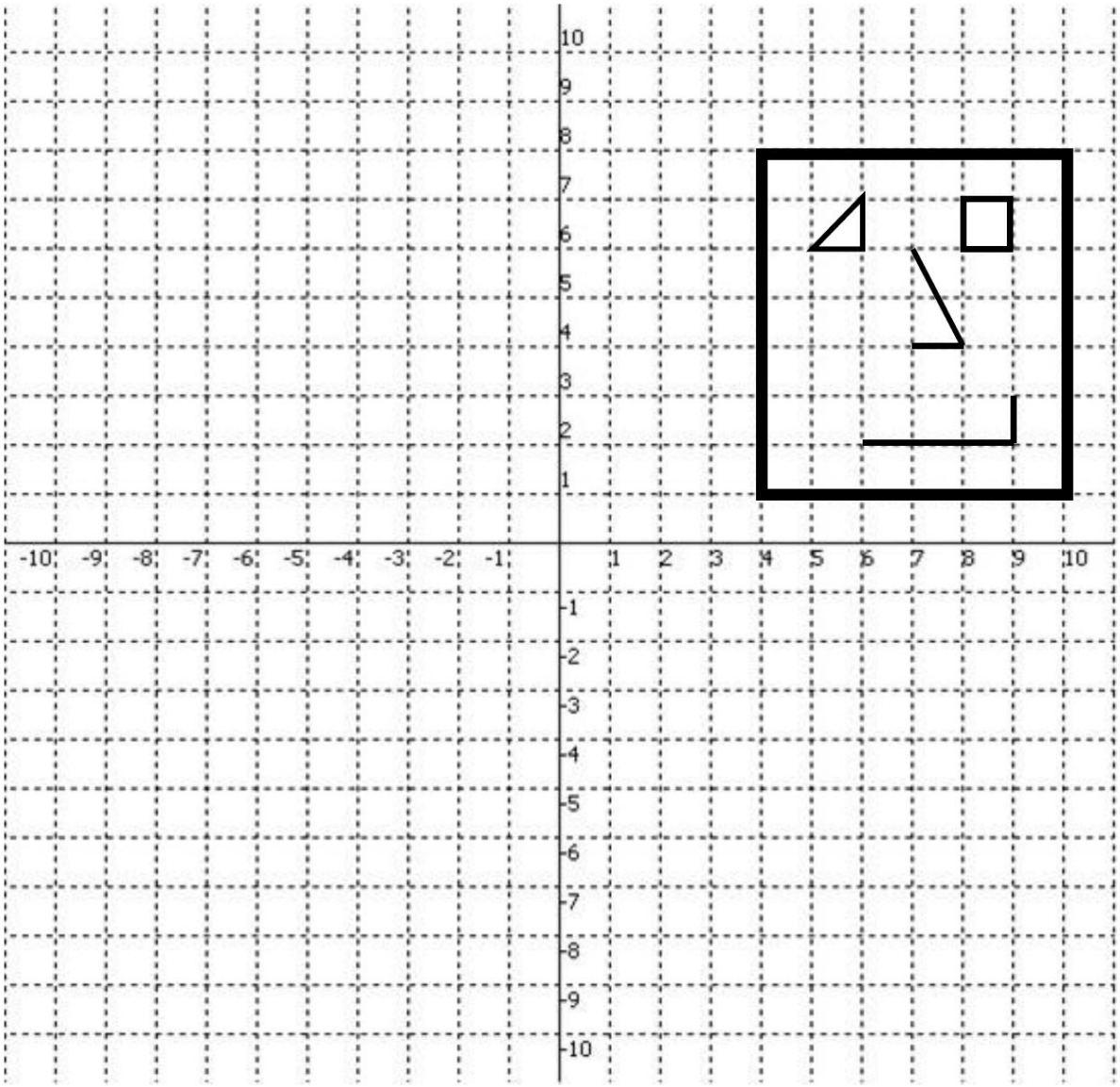
Mouth:

Nose:

Left Eye:

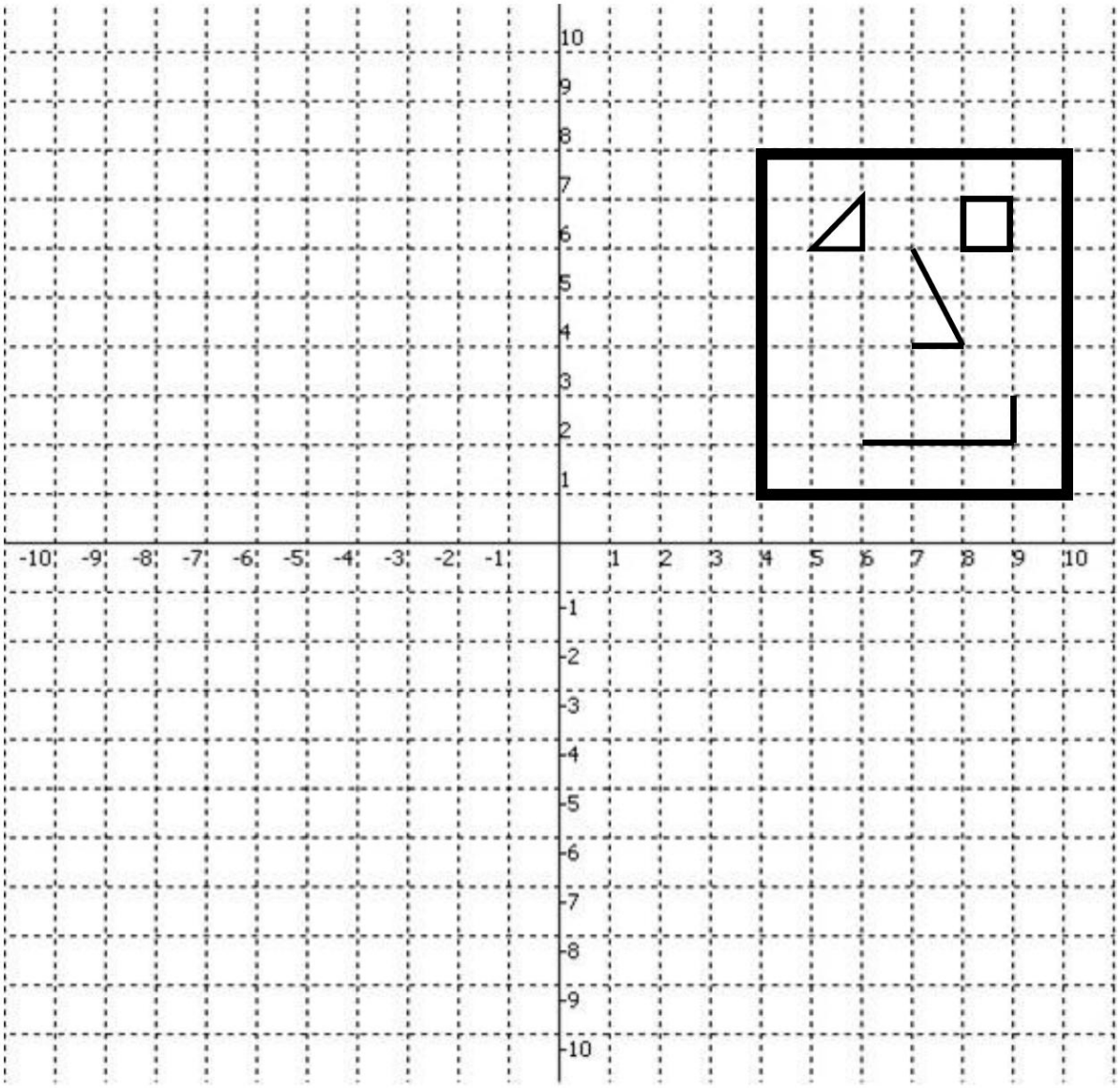
Right Eye:

Hook: Transformations – Task 2



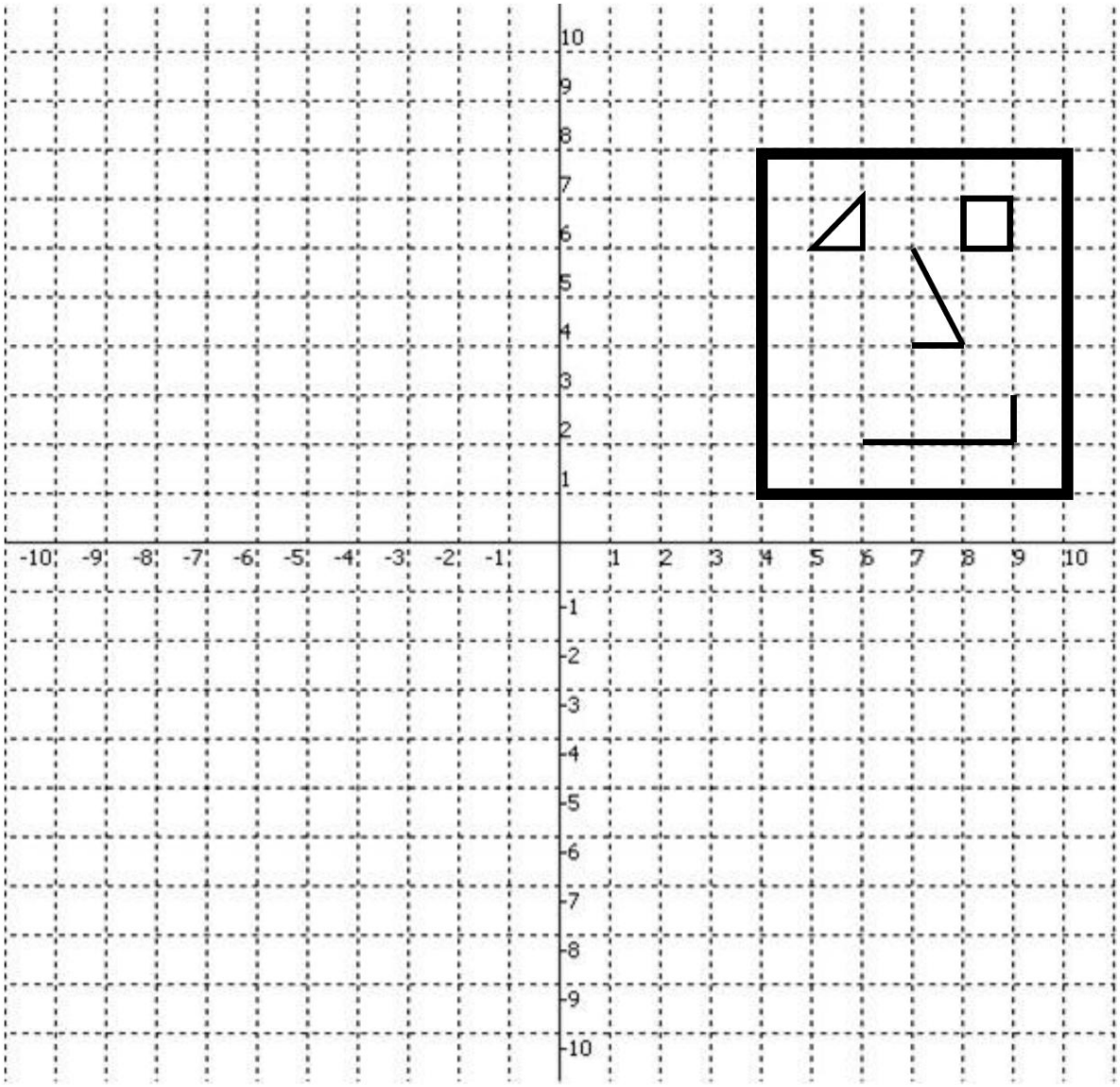
Coordinates of image (x, y)	In your team, for each order pair provided on the left, transform the face by applying the following rule to each point $x' = -y$ $y' = -x$	Coordinates of new image (x', y')
Outline: (4,1), (4,8), (10,8), (10,1)		Outline:
Mouth: (9,3), (9,2) (6,2)		Mouth:
Nose: (7,6), (8,4), (7,4)		Nose:
Left Eye: (5,6), (6,6), (6,7)		Left Eye:
Right Eye: (8,6), (8,7), (9,7), (9,6)		Right Eye:

Hook: Transformations – Task 3



Coordinates of image (x, y)	In your team, for each order pair provided on the left, transform the face by applying the following rule to each point	Coordinates of new image (x', y')
Outline: (4,1), (4,8), (10,8), (10,1)	$x' = y$	Outline:
Mouth: (9,3), (9,2) (6,2)	$y' = -x$	Mouth:
Nose: (7,6), (8,4), (7,4)		Nose:
Left Eye: (5,6), (6,6), (6,7)		Left Eye:
Right Eye: (8,6), (8,7), (9,7), (9,6)		Right Eye:

Hook: Transformations – Task 4



Coordinates of image (x, y)

Outline: (4,1), (4,8), (10,8), (10,1)

Mouth: (9,3), (9,2) (6,2)

Nose: (7,6), (8,4), (7,4)

Left Eye: (5,6), (6,6), (6,7)

Right Eye: (8,6), (8,7), (9,7), (9,6)

In your team, for each order pair provided on the left, transform the face by applying the following rule to each point

$x' = x-7$

$y' = y+2$

Coordinates of new image (x', y')

Outline:

Mouth:

Nose:

Left Eye:

Right Eye:

Hook: Transformations – Base Group – Part 2

In your team, answer each of the following questions using the information you've learned from the Experts in your Base Group. Your answer should include all Experts' answers.

Describe your transformation rule: _____

_____
_____
_____
_____
_____
_____

Compare the original face with the new face (its image): _____

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Summarize how your face has changed in complete sentences: _____

_____
_____
_____
_____
_____

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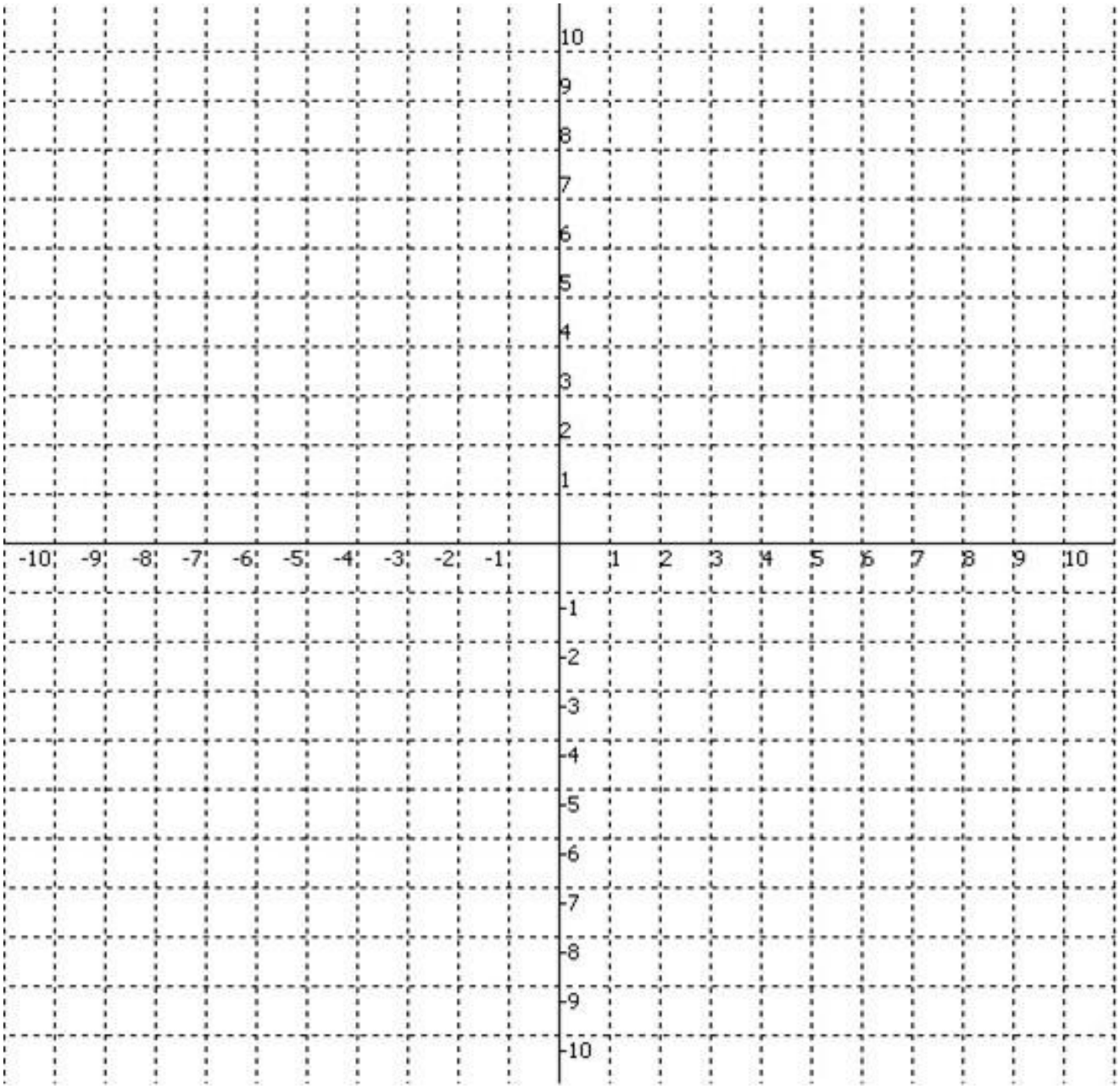
What will it be?



Directions: Plot the point (0,2), then create new points according to the following transformations. You must go in order, otherwise your picture will not come out correct. Connect the points **after** you have plotted every transformation according to the order given to the right of the table.

Transformation	New Coordinate
1. Translate up 5 and right 3	(,)
2. Reflect over the y-axis	(,)
3. Translate down 10	(,)
4. Reflect over x-axis	(,)
5. Rotate 180°	(,)
6. Reflect over x-axis	(,)
7. Translate (x-2,y-1)	(,)
8. Reflect over y-axis	(,)
9. Translate (x+4,y-1)	(,)
10. Reflect over y-axis	(,)
11. Translate left 1 and down 2	(,)
12. Rotate 90° counterclockwise	(,)
13. Translate up 3 and right 3	(,)
14. Rotate 90° clockwise	(,)
15. Translate (x+1,y+6)	(,)

Connect the coordinates in this order:

1, 6, 7, 9, 13, 5, 12, 14,3, 11, 10, 8, 4, 2, 15

Extra points for _____

(-2,1), (-1,1), (-1, 0)

Extra points for _____

(2,1), (1,1), (1, 0)

Extra points for _____

(-1,-1), (1,-1), (0, -2)

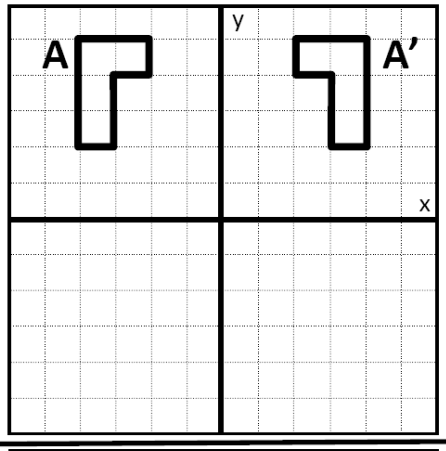
Extra points for _____

(-3,-2), (-2,-3), (-1, -3), (0,-2), (1,-3), (2,-3), (3,-2)

Exploration of Reflections Name _____Period ___

For each pairs of figures, compare the figures A and A', where A' is the new image of A.
Denote: A' is read as "A prime"; A'' is read as "A double-prime".

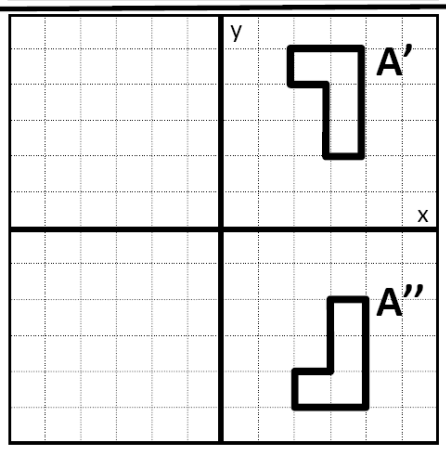
1



a) Describe how A is transformed to A'. (Explain how to move A to A'.)

b) How are the key features of the shape of figure A alike or different from figure A'?

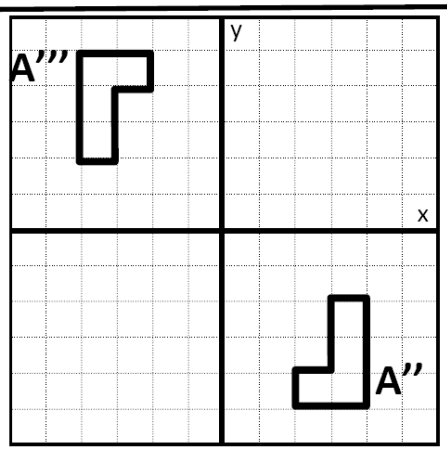
2



a) Describe how A' is transformed to A''.

b) How are the key features of the shape of figure A alike or different from figure A'?

3



a) Describe how A'' is transformed to A'''.

b) How are the key features of the shapes of figure A, A', A'', and A''' all alike or different from each other?

4

Describe the relationship between Figures A and A'''. Describe the journey of how Figure A is transformed to Figure A''' during the three steps above.

5

In your own words, describe your understanding of reflection or reflected figures.

6

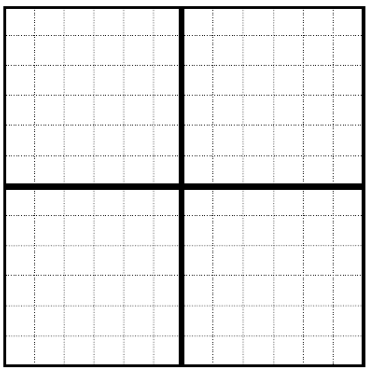
Formal Definition:

7

Evaluate your definition above in 5 in comparison to the formal definition in 6. What are the similarities and differences between the two definitions?

8

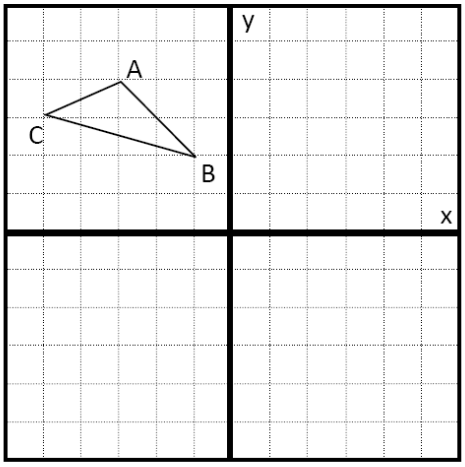
Draw your own figure and reflect it. Describe the reflection.



Reflections

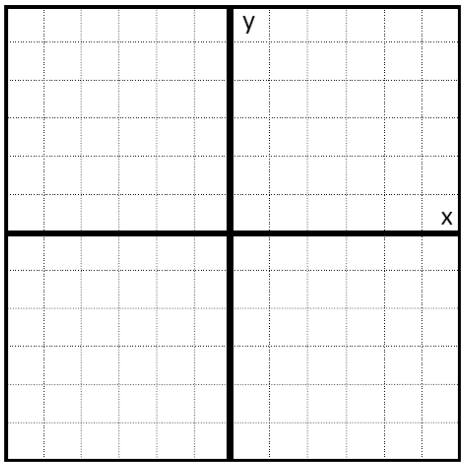
Name _____ Period _____

1) Reflect triangle A about the y-axis to create triangle A'. What are the coordinates of A'?



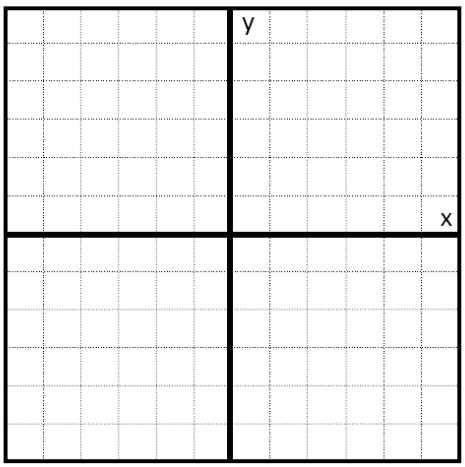
_____, _____, _____,

2) Draw A' (from #1) on the grid below and then reflect it about the x-axis to create triangle A''. What are the coordinates of A''?



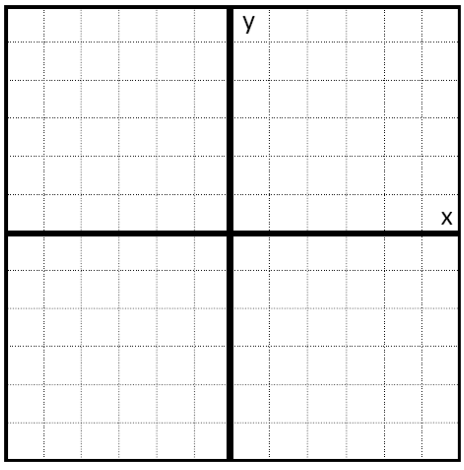
_____, _____, _____,

3) Reflect A'' about x = 1 to create triangle A'''. What are the coordinates of A'''?



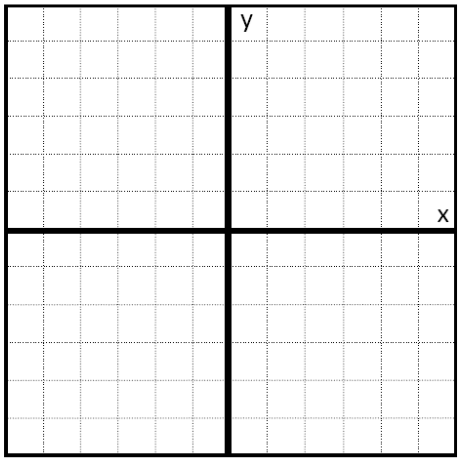
_____, _____, _____,

4) Reflect A''' about y = 1 to create triangle A''''. What are the coordinates of A''''?



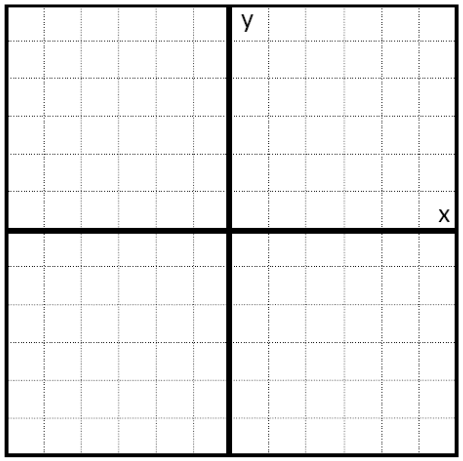
_____, _____, _____,

5) Reflect A’’’’ about x = -3 to create triangle A’’’’’. What are the coordinates of A’’’’’?



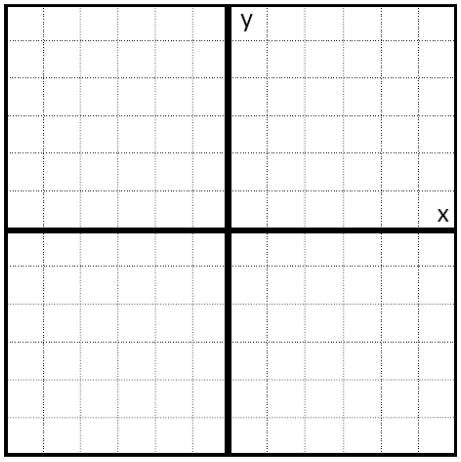
_____, _____, _____,

6) Reflect A’’’’’ about y = -2 to create triangle A’’’’’’. What are the coordinates of A’’’’’’?



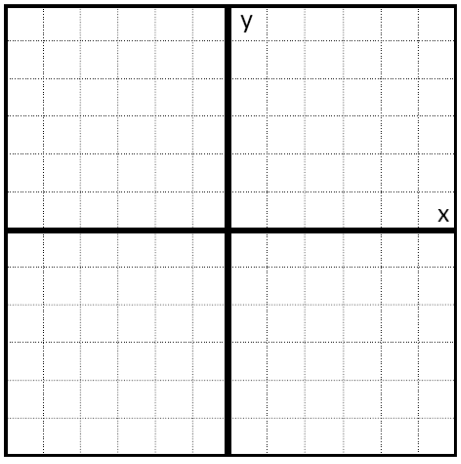
_____, _____, _____,

7) Reflect A’’’’’’ about y = x to create triangle A’’’’’’’. What are the coordinates of A’’’’’’’?



_____, _____, _____,

8) Reflect A’’’’’’’ about y = -x to create triangle A’’’’’’’’. What are the coordinates of A’’’’’’’’?



_____, _____, _____,

Strengthening Reflections Name _____Period _____

Definition in your own words

Facts/ Characteristics
(Symbols, representations, traits)

Reflection

Examples
(What does it look like? – model, Illustration, diagram)

Non-Examples
(What does it look like?)

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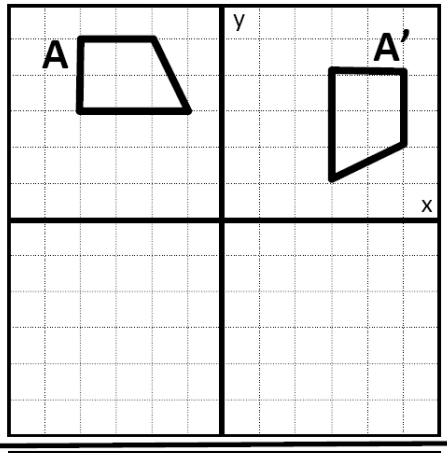
Exploration of Rotations Name _____Period___

For each pair of figures, compare the figures A and A', where A' is the new image of A.
Denote: A' is read as "A prime"; A'' is read as "A double-prime".

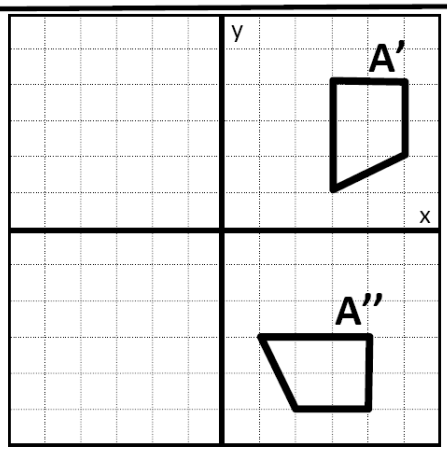
1



a) Describe how A is transformed to A'. (Explain how to move A to A'.)

b) How are the key features of the shape of figure A alike or different from figure A'?

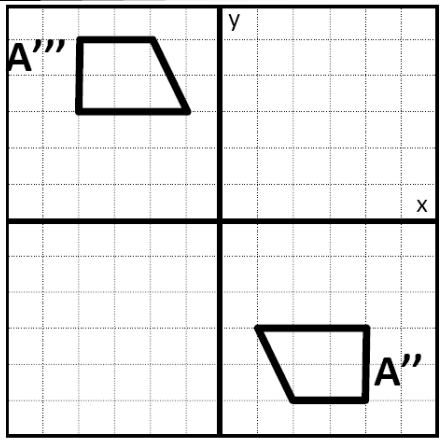
2



a) Describe how A' is transformed to A''

b) How are the key features of the shape of figure A alike or different from figure A'?

3



a) Describe how A'' is transformed to A'''.

b) How are the key features of the shapes of figure A, A', A'', and A''' all alike or different from each other?

4

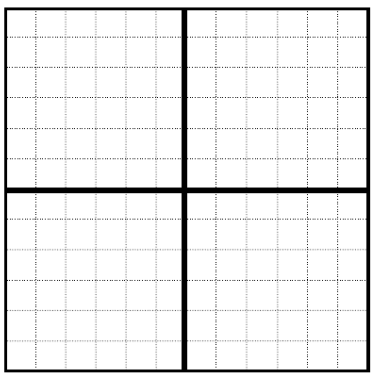
Describe the relationship between Figures A and A'''. Describe the journey of how Figure A is transformed to Figure A''' during the three steps above.

5 In your own words, define a rotation:

6 Formal Definition:

7 Evaluate the differences and similarities in your definition and the formal definition above.

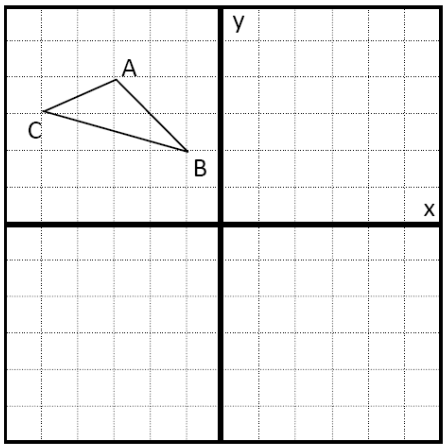
8 Draw your own figure and rotate it. Describe its rotation.



Rotations

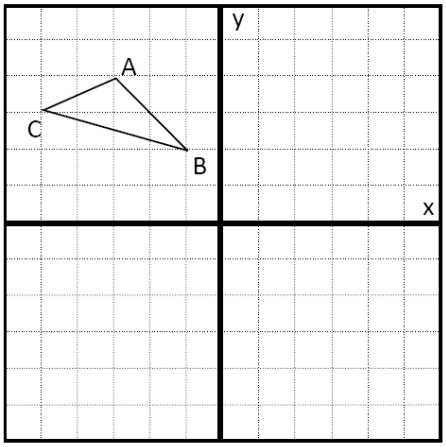
Name _____ Period _____

1) Rotate triangle ABC 90 degrees clockwise to create triangle DEF. State the coordinates.



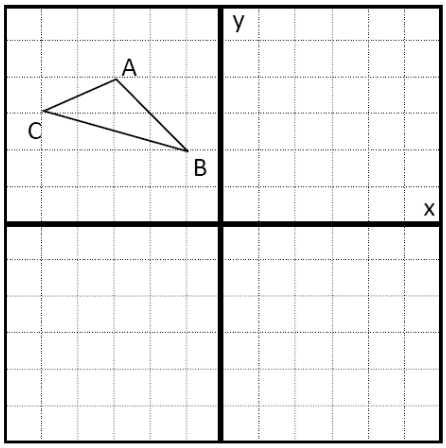
_____, _____, _____,

2) Rotate triangle ABC 90 degrees counterclockwise to create triangle GHI. State the coordinates.



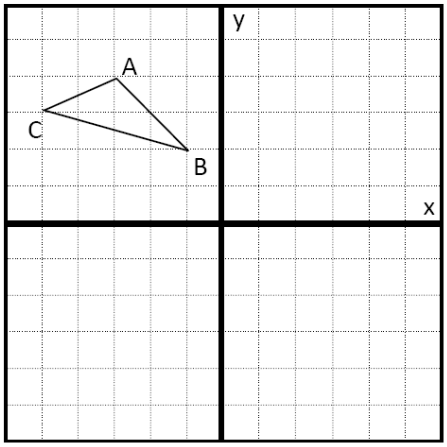
_____, _____, _____,

3) Rotate triangle ABC 180 degrees about the origin to create triangle JKL. State the coordinates.



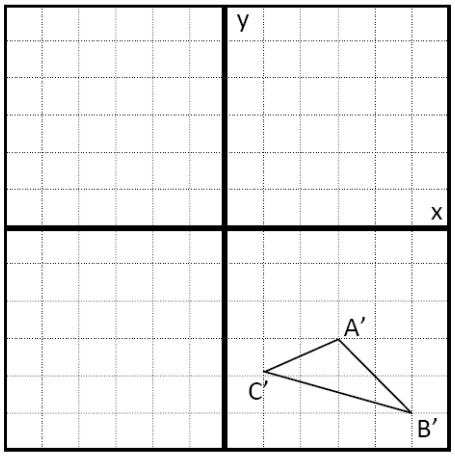
_____, _____, _____,

4) Rotate triangle ABC 270 degrees counterclockwise to create triangle MNO. State the coordinates.



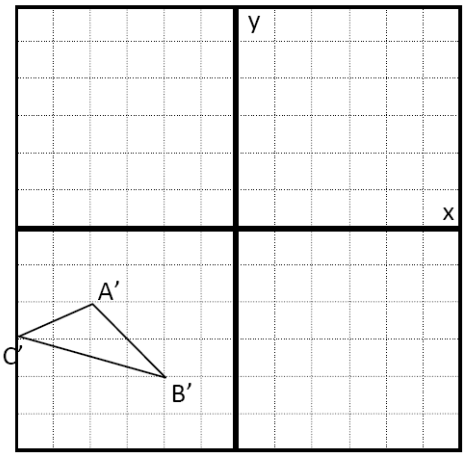
_____, _____, _____,

5) If the below triangle A'B'C' is the result of a triangle that was rotated 180 degrees about the origin, state the coordinates of the original triangle ABC.



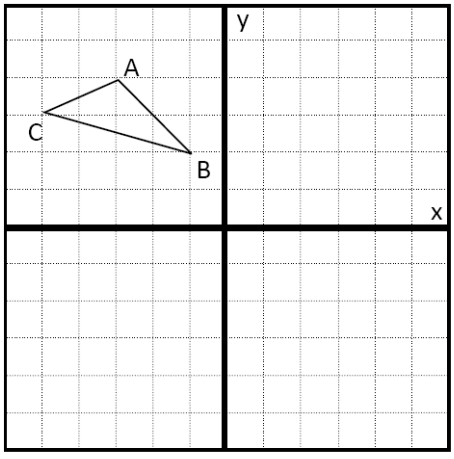
_____, _____, _____,

6) If the below triangle A'B'C' is the result of a triangle that was rotated 90 degrees counterclockwise, state the coordinates of the original triangle ABC.



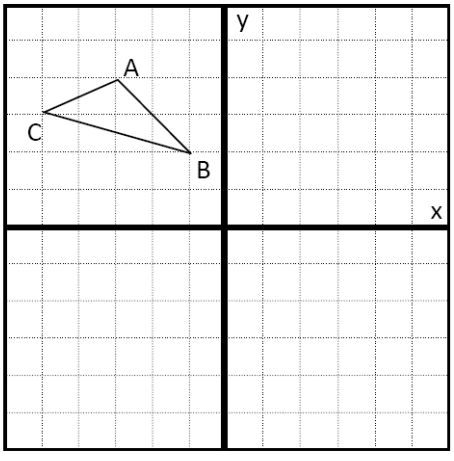
_____, _____, _____,

7) Rotate triangle ABC 45 degrees clockwise to create triangle XYZ. State the coordinates.



_____, _____, _____,

8) Rotate triangle ABC 45 degrees counterclockwise to create triangle XYZ. State the coordinates.



_____, _____, _____,

Strengthening Rotations Name _____Period _____

Definition in your own words

Facts/ Characteristics
(Symbols, representations, traits)

Rotation

Examples
(What does it look like? – model, Illustration, diagram)

Non-Examples
(What does it look like?)

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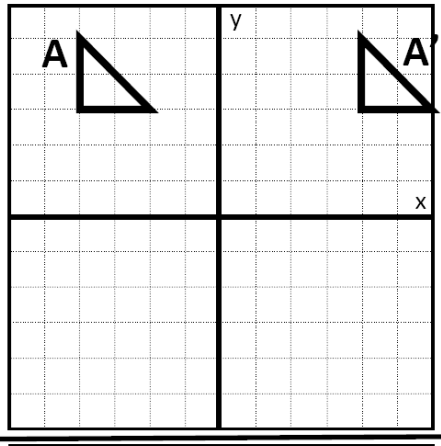
Exploration of Translations Name _____ Period

For each pairs of figures, compare the figures A and A', where A' is the new image of A.
Denote: A' is read as "A prime"; A'' is read as "A double-prime".

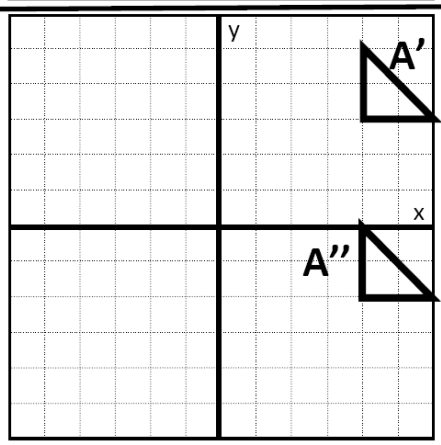
1



a) Describe how A is transformed to A'

b) How are the key features of the shape of figure A alike or different from figure A'?

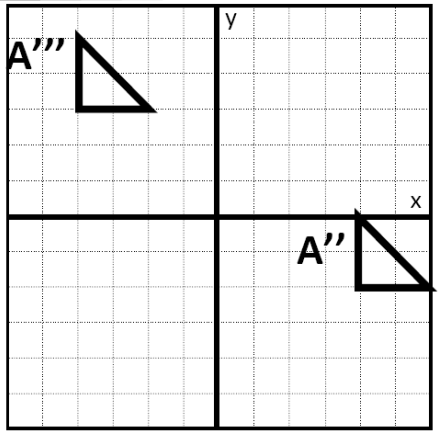
2



a) Describe how A' is transformed to A''

b) How are the key features of the shape of figure A alike or different from figure A'?

3



a) Describe how A'' is translated to A'''

b) How are the key features of the shapes of figure A, A', A'', and A''' all alike or different from each other?

4

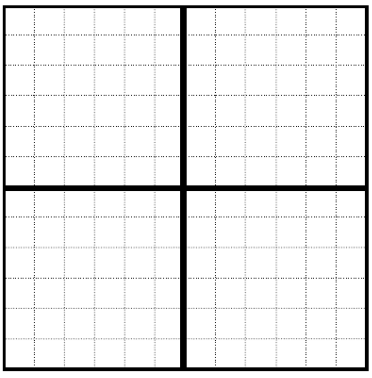
a) Describe the relationship between Figures A and A'''. Describe the journey of how Figure A is transformed into Figure A''' during the three steps above.

5 In your own words, define a translation:

6 Formal Definition:

7 Evaluate the differences and similarities of your definition and formal definition above.

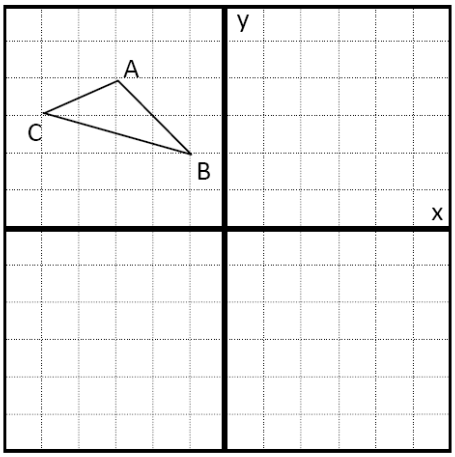
8 Draw your own figure and translate it. Describe its translation.



Translations Name _____ Period _____

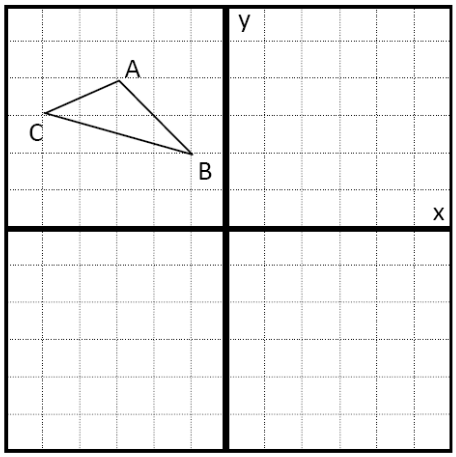
1) Translate triangle ABC using the following motion rule to create triangles DEF. State the coordinates.

(x, y) → (x + 5, y - 1)



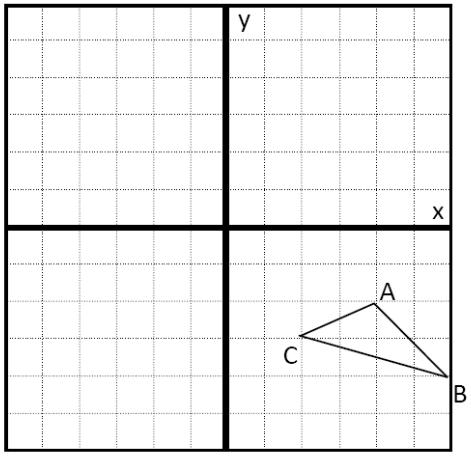
_____, _____, _____,

2) Translate triangle ABC 5 units left and 1 unit u to create triangle GHI. State the coordinates.



_____, _____, _____,

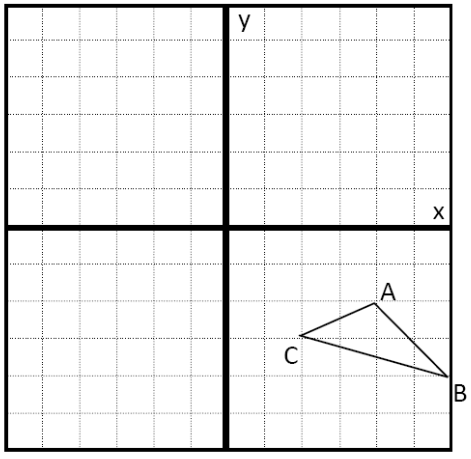
3) Translate triangle ABC 3 units left and 7 units up to create triangle JKL. State the coordinates.



_____, _____, _____,

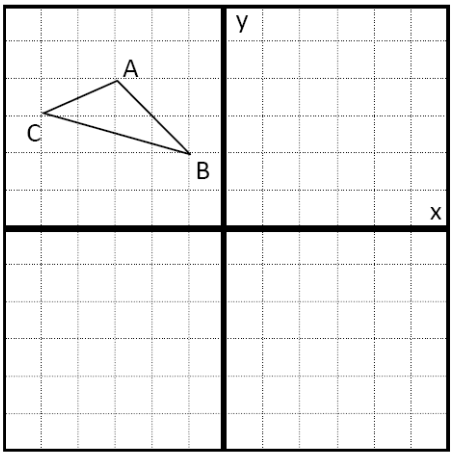
4) Translate triangle ABC using the following motion rule to create triangles MNO. State the coordinates.

(x, y) → (x - 3, y + 7)



_____, _____, _____,

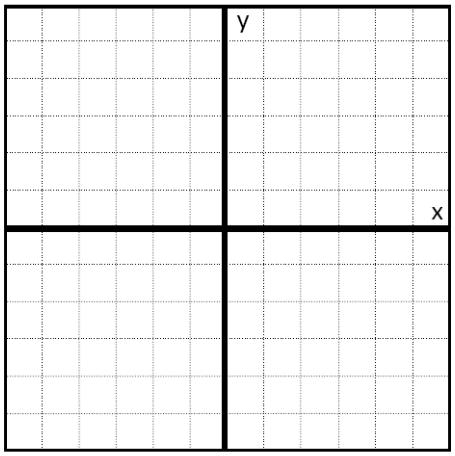
5) Translate triangle A 5 units right and 2 units up to create triangle A'. State the coordinates.



_____, _____, _____,

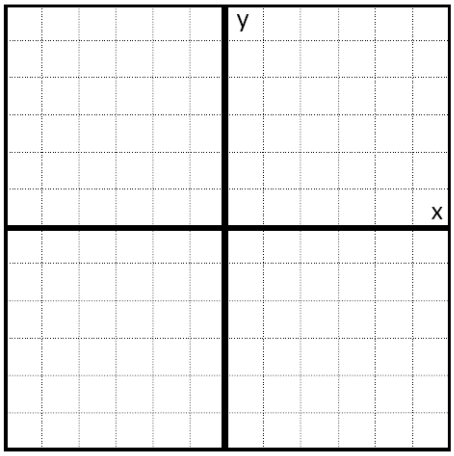
6) Translate triangle A' using the following motion rule to create triangles A''. State the coordinates.

(x, y) → (x, y - 1.5)



_____, _____, _____,

7) Translate triangle A'' 4 units left and 2 units down. Then translate it 5 units right and 2 units down to create triangle A''''. State the coordinates.

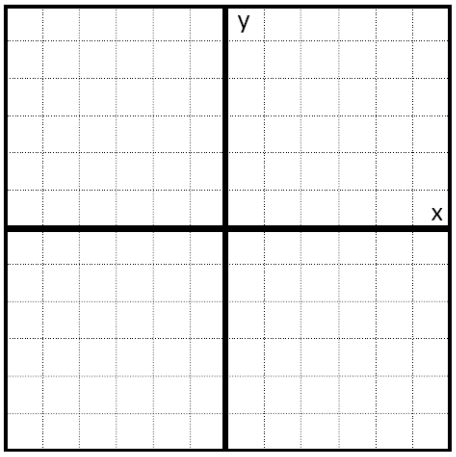


_____, _____, _____,

8) Translate triangle A'''' using the following motion rules to create triangles A''''''. State the coordinates.

(x, y) → (x - 6, y - 5)

(x, y) → (x - 5, y + 6)



_____, _____, _____,

Strengthening Translations Name _____Period _____

Definition in your own words

Facts/ Characteristics
(Symbols, representations, traits)

Translations

Examples
(What does it look like? – model, Illustration, diagram)

Non-Examples
(What does it look like?)

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Synthesis/Inductive/Deductive Task **Name _____**

One of your best friends, Jairique, was in a car accident and has been in the hospital for the last few days. As a top student at his school, Jairique is concerned about his recovery, but he also cares about what he is missing in his Geometry class. He has asked you to take notes and tutor him.

This particular lesson is focused on a geometric _____(transformation type). As a good friend, you understand his strengths and weaknesses and want to help him understand this concept to the best of his abilities. There is one catch, however. Jairique hates memorizing math concepts. He does much better if he can see things visually.

You convince some other friends to help you create a lesson summary for Jairique. The lesson can be presented, using PowerPoint, Foldable, Thinking Map, or poster. Remember, Jairique's greatest strength is his creativity, so keep that in your mind as you create your summary.

You also convince your teacher to give you extra credit points for making this lesson. She agrees, but she has certain criteria to earn these points.

The lesson needs to be:

- A stand-alone lesson/poster/work so that is self-explanatory
- Organized, with accurate and concise information that is easily understood
- A visual summary of your findings about _____ (transformation type). This means you will need to include diagrams and a brief explanation.

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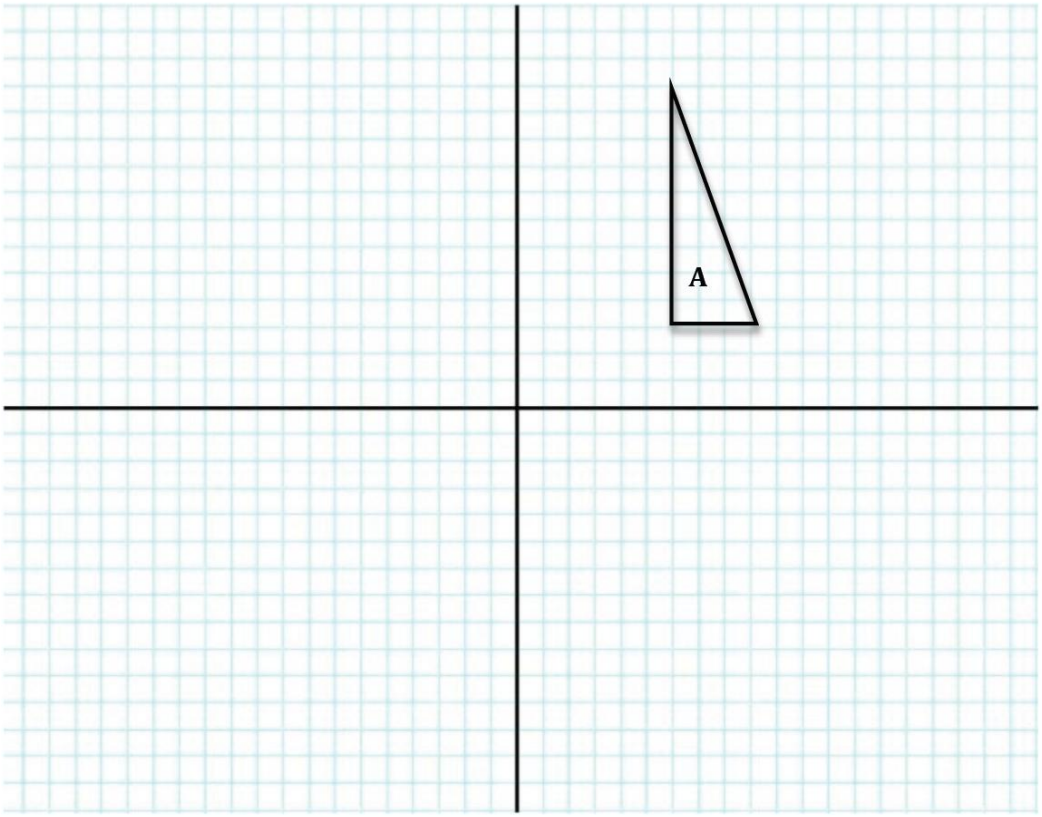
Flip Sliding Away
Assessment Task

Wendy drew a right triangle on the coordinate gird and labeled it Triangle A.



1. What are the coordinates of the three vertices of the triangle?

   _____ _____ _____

2. Wendy reflected Triangle **A** about the x- axis. Draw the reflected figure on the coordinate axis above. Label that figure **B.**

   What are the coordinates of the reflected figure **B**?

   _____ _____ _____

   How has the size of the triangle changed? Explain.

Flip Sliding Away
Assessment Task

3. Wendy translated the original figure **A** so that the vertex of the new figure's right angle is at (-3, -5). Draw the new figure and label it **C.**

   Write the translation from figure **A** to figure **C**

   _____

4. Wendy rotated the original triangle **A** counterclockwise 180º about the origin. Draw the rotated triangle **D** on the coordinate axis. Label the figure **D**.

   List the coordinate points of figure **D.**

   _____ _____ _____

5. Determine a one step transformation that will map triangle **D** to triangle **B.**

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