MAY 4, 2016

UNIT 7: SIMILARITY AND TRANSFORMATIONS

7.7: IDENTIFYING TYPES OF SYMMETRY ON THE CARTESIAN PLANE

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MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

We will continue working on the Math 9 Specific Curriculum Outcome (SCO) "Shape and Space 5" OR "SS5" which states:

"Demonstrate an understanding of line and rotation symmetry."

What does THAT mean???

SCO SS5 means that we will:

* **classify a given set of 2-D shapes or designs according to the number of lines of symmetry**
* **complete a 2-D shape or design given one half of the shape or design and a line of symmetry**
* **determine if a 2-D shape or design has rotational symmetry about the point at the centre of the shape or design and, if it does, state the order and angle of rotation**
* **rotate a given 2-D shape about a vertex and draw the resulting image**
* **identify a line of symmetry or the order and angle of rotation symmetry in a given tessellation**
* **identify the type of symmetry that arises from a given transformation on the Cartesian plane**
* **complete, concretely or pictorially, a given transformation of a 2-D shape on a Cartesian plane, record the coordinates and describe the type of symmetry that results**
* **identify and describe the types of symmetry created in a given piece of artwork**
* **determine whether or not two given 2-D shapes on the Cartesian plane are related by either rotational or line symmetry**
* **draw, on a Cartesian plane, the translation image of a given shape using a given translation rule, such as R2, U3, label each vertex and its corresponding ordered pair and describe why the translation does not result in line or rotational symmetry**

What does THAT mean???

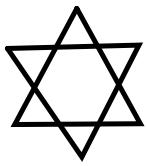
In today's lesson, we will work on the following achievement indicators for SCO SS5:

* **identify the type of symmetry that arises from a given transformation on the Cartesian plane**
* **complete, concretely or pictorially, a given transformation of a 2-D shape on a Cartesian plane, record the coordinates and describe the type of symmetry that results**
* **identify and describe the types of symmetry created in a given piece of artwork**
* **determine whether or not two given 2-D shapes on the Cartesian plane are related by either rotational or line symmetry**
* **draw, on a Cartesian plane, the translation image of a given shape using a given translation rule, such as R2, U3, label each vertex and its corresponding ordered pair and describe why the translation does not result in line or rotational symmetry**

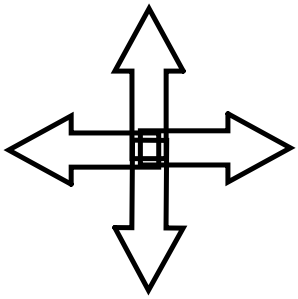
WARM UP:

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

1.



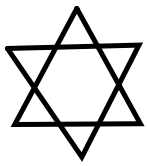
2.



WARM UP:

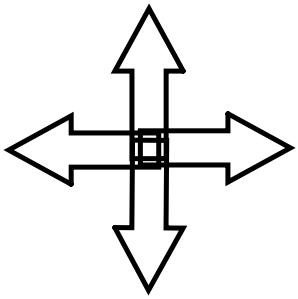
Determine if the following shapes have rotational symmetry. If so, state their order of rotation and their angle of rotation symmetry.

1.



Order of Rotation: 6
Angle of Rotation: 60°

2.



Order of Rotation: 4
Angle of Rotation: 90°

HOMEWORK QUESTIONS?

(pages 365/6/7, #4, 5, 6, 8, 9, 12, 14 & 15)

TRANSFORMATIONS INVESTIGATION:

Your mission, should you choose to accept it (and, BTW, you MUST accept it), is to investigate 3 suspicious transformations: a reflection, a rotation and a translation.

You will determine if these transformations result in a shape you can describe and if they have line symmetry and/or rotational symmetry. READY?

GO!!!!!!!!

TRANSFORMATION #1:

a) Set up a grid. Use values of -2 to +6 on both the x and y axis. (NOTE: You may choose to do these 3 transformations on one grid. To do so, you will need to use values of -4 to +10 on both the x and y axis.)

TRANSFORMATION #1:

b) **Plot and join the points A (1 , 3), B (3 , 1) and C (5 , 5) to form triangle ABC on your grid.**

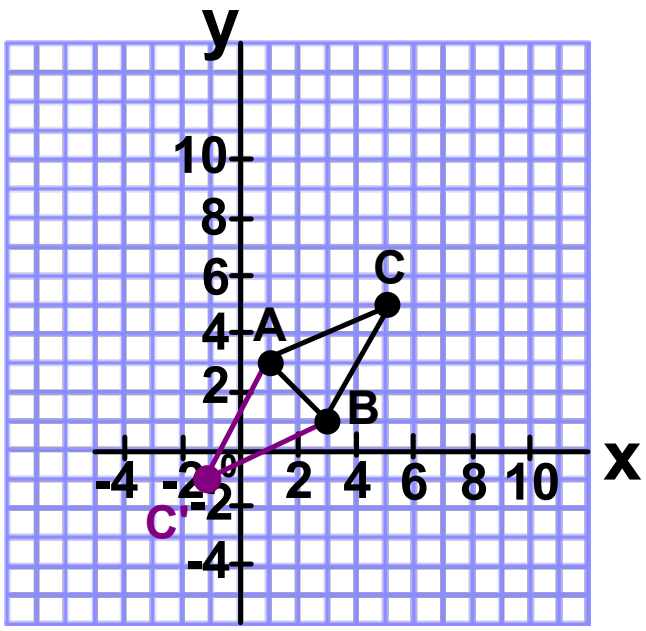
c) **Reflect triangle ABC through line AB Label the coordinates of any new vertices in the reflection image.**

USING YOUR GRAPH, ANSWER THE FOLLOWING QUESTIONS:

i) **Do the 2 triangles, as a whole, form a shape? If so, describe it.**

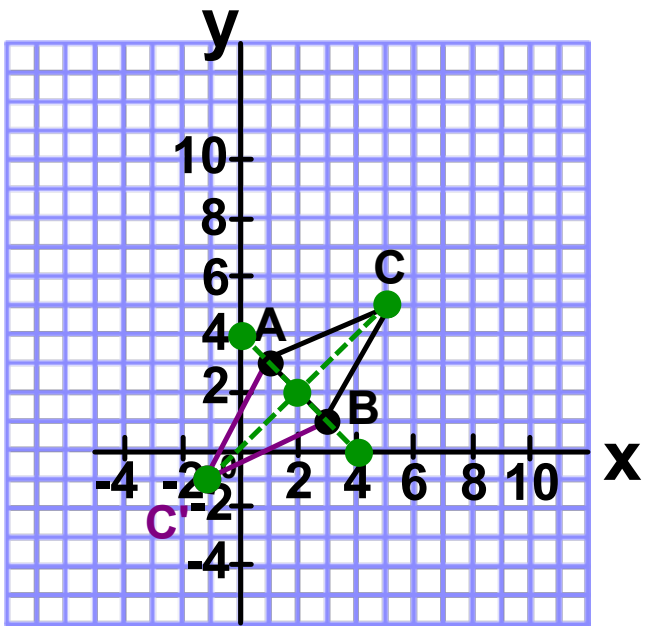
ii) **Do the 2 triangles, as a whole, have line symmetry? If so, describe it.**

iii) **Do the 2 triangles, as a whole, have rotational symmetry? If so, describe it.**



Coordinates:

C' (-1 , -1)



Coordinates:

C' (-1 , -1)

i) The 2 triangles form a rhombus (ACBC'; a parallelogram with 4 equal sides).

ii) They have line symmetry in the oblique lines passing through points (0 , 4) and (4 , 0) AND (-1 , -1) and (5 , 5).

iii) They have rotational symmetry of order 2 about point (2 , 2).

TRANSFORMATION #2:

a) Set up a grid (unless you are using the same one for all 3 transformations). Use values of 0 to +10 on both the x and y axis.

b) Plot and join the points A (1 , 3), B (3 , 1) and C (5 , 5) to form triangle ABC on your grid.

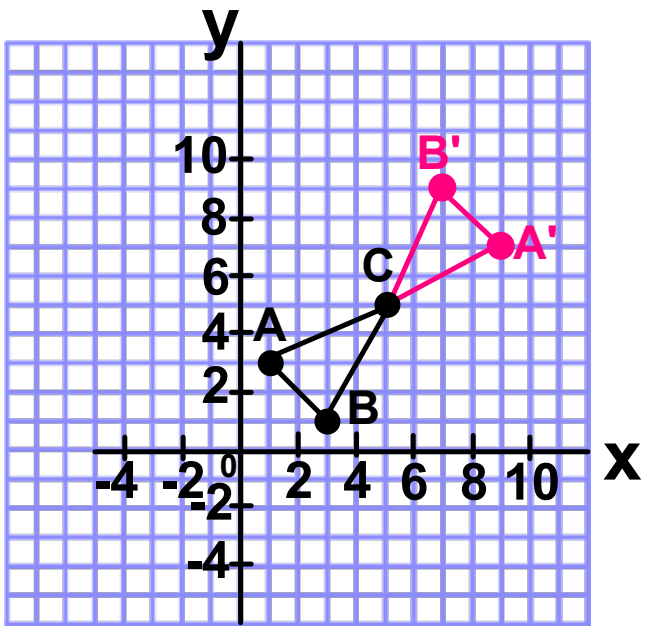
c) Rotate triangle ABC 180° about vertex C. Label the coordinates of any new vertices in the rotation image.

USING YOUR GRAPH, ANSWER THE FOLLOWING QUESTIONS:

i) **Do the 2 triangles, as a whole, form a shape? If so, describe it.**

ii) **Do the 2 triangles, as a whole, have line symmetry? If so, describe it.**

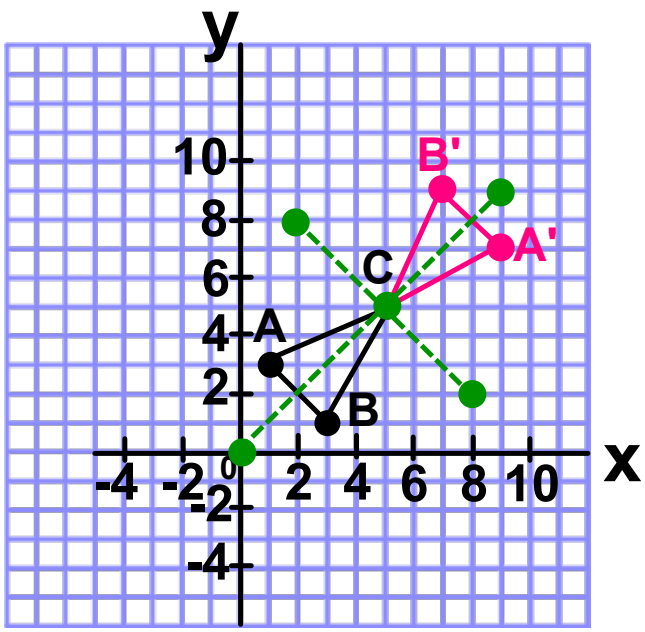
iii) **Do the 2 triangles, as a whole, have rotational symmetry? If so, describe it.**



Coordinates:

A' (9 , 7)

B' (7 , 9)



Coordinates:

A' (9 , 7)

B' (7 , 9)

i) The 2 triangles form a hexagon shape (BACB'A').

ii) They have line symmetry in the oblique lines passing through points (2 , 8) and (8 , 2) AND (2 , 2) and (8 , 8).

iii) They have rotational symmetry of order 2 about vertex C (5 , 5).

TRANSFORMATION #3:

a) Set up a grid (unless you are using the same one for all 3 transformations). Use values of 0 to +8 on the x-axis and -2 to +6 on the y-axis.

b) Plot and join the points A (1 , 3), B (3 , 1) and C (5 , 5) to form triangle ABC on your grid.

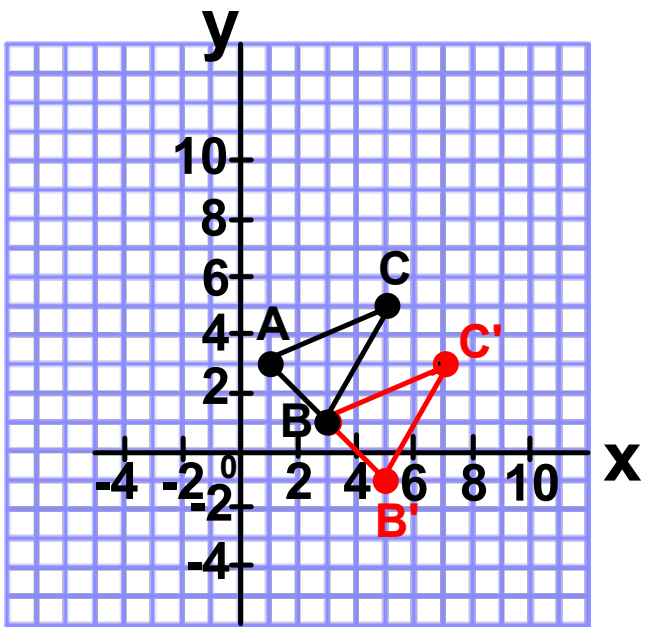
c) Translate triangle ABC 2 units right and 2 units down (R2 , D2) Label the coordinates of any new vertices in the translation image.

USING YOUR GRAPH, ANSWER THE FOLLOWING QUESTIONS:

i) **Do the 2 triangles, as a whole, form a shape? If so, describe it.**

ii) **Do the 2 triangles, as a whole, have line symmetry? If so, describe it.**

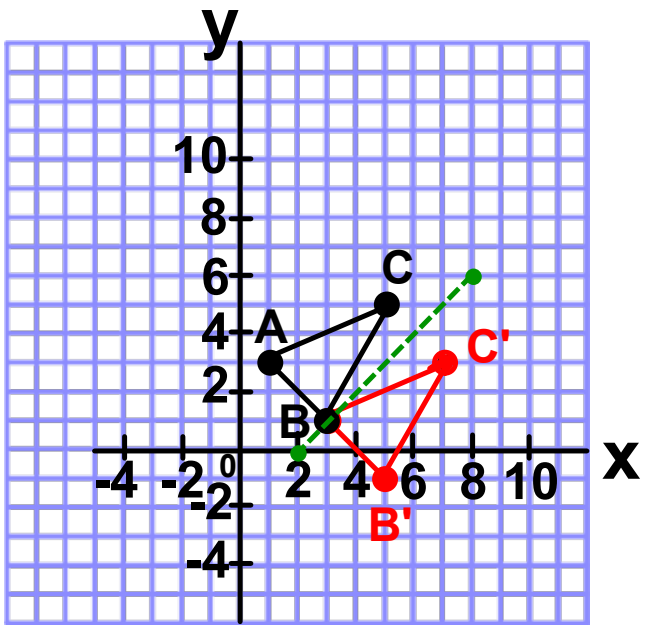
iii) **Do the 2 triangles, as a whole, have rotational symmetry? If so, describe it.**



Coordinates:

B' (5 , -1)

C' (7 , 3)



Coordinates:

B' (5 , -1)

C' (7 , 3)

i) The 2 triangles form a hexagon shape.

ii) They have line symmetry in the oblique line passing through points (3 , 1) and (6 , 4).

iii) They do NOT have rotational symmetry because there is no point about which they can be rotated so that they coincide with themselves.

CONCEPT REINFORCEMENT:

MMS9:
PAGE 373: #3, #5 & #6
PAGE 374: #8, #9, #10 & #11
PAGE 375: #15

TEST PREPARATION - SUGGESTED PRACTICE QUESTIONS:

MMS9:

PAGE 376: STUDY GUIDE
PAGE 377/8/9: #3, #6, #8 TO #12 & #14 TO #19
PAGE 380: PRACTICE TEST, #1, #2 & #4
PAGE 465/6: #14 TO #17

WORKSHEETS:

7.1: #1, #2 & #5
7.2: #1, #3 & #4
7.3: #1, #3 & #4
7.4: #1 TO #4
7.5: #1 TO #3
7.6: #1 TO #5
7.7: #1 TO #4