April 20, 2018

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?

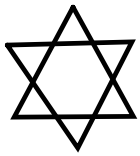
We will continue working on the Math 9 Specific Curriculum Outcome (SCO) "Shape and Space 5" OR "SS5" which states:

"Demonstrate an understanding of line and rotation symmetry."

WARM UP:

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

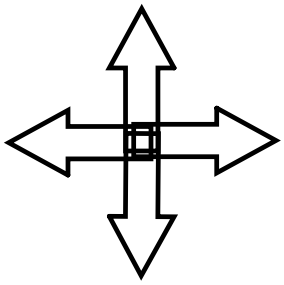
1.



order = 6

angle of rotation = $\frac{360}{6}$ = 60

2.



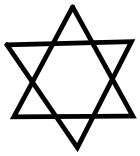
order = 4

angle of rotation = $\frac{360}{4}$ = 90°

WARM UP:

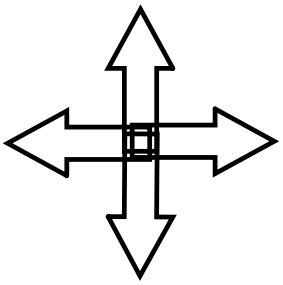
Determine if the following shapes have rotational symmetry. If so, state their order of rotation and their angle of rotation symmetry.

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.

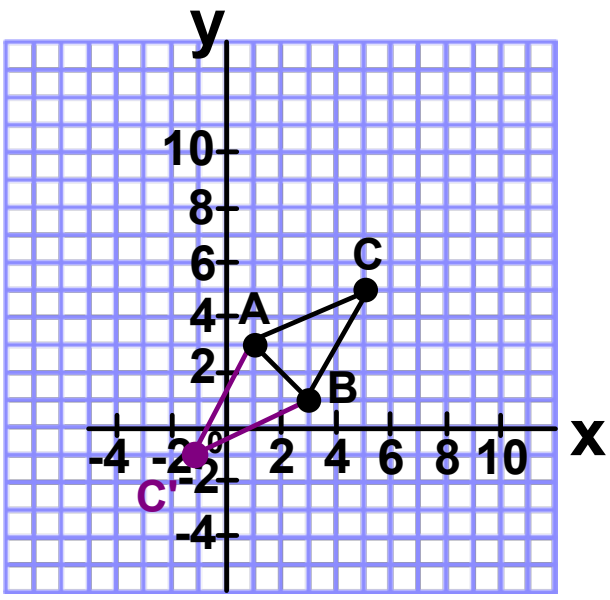
c) Reflect triangle ABC through line AB Label the coordinates of any new vertices in the reflection image.

USING YOUR GRAPH, ANSWER THE FOLLOWING QUESTIONS:

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

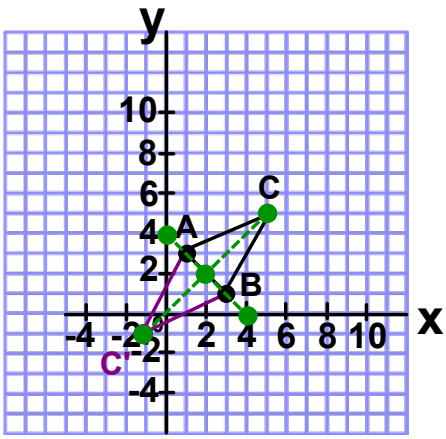
ii) Do the 2 triangles, as a whole, have line symmetry? If so, describe it.

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.

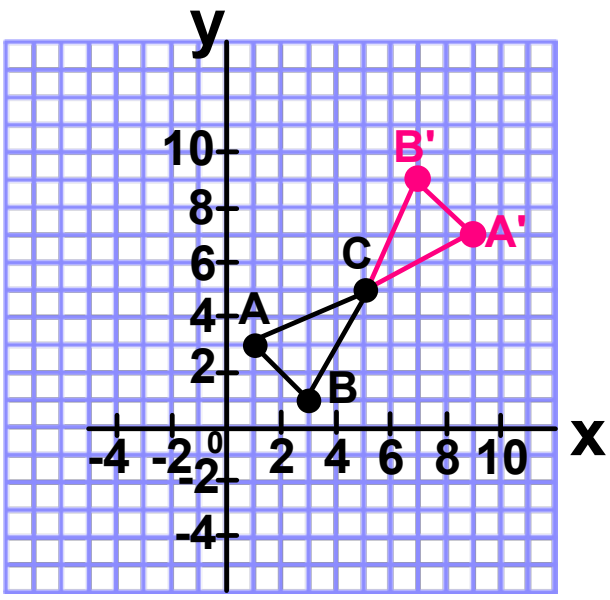
c) Rotate triangle ABC 180° about vertex C. Label the coordinates of any new vertices in the rotation image.

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.

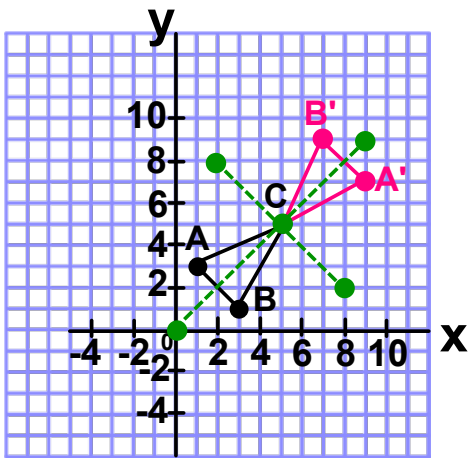
iii) Do the 2 triangles, as a whole, have rotational symmetry? If so, describe it.



Coordinates:

A' (9 , 7)

B' (7 , 9)



Coordinates:

A' (9 , 7)

B' (7 , 9)

i) The 2 triangles form a "bow tie" shape (BACB'A').

ii) They have line symmetry in the oblique lines passing through points (2 , 8) and (8 , 2) AND (0 , 0) and (9 , 9).

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.

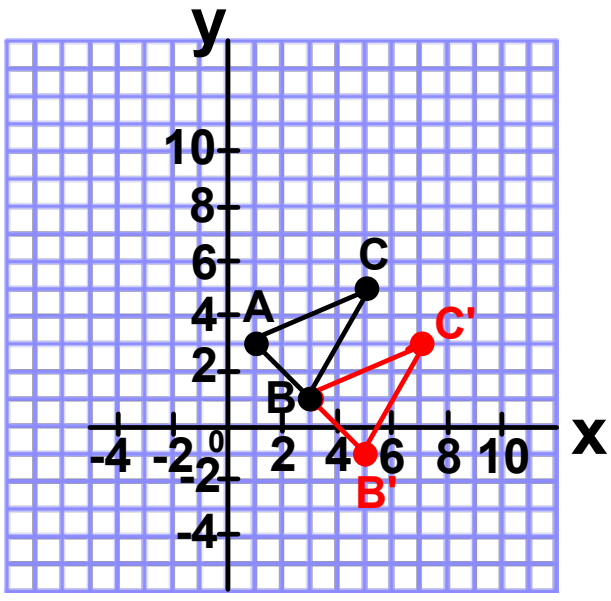
c) Translate triangle ABC 2 units right and 2 units down (R2 , D2) Label the coordinates of any new vertices in the translation image.

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.

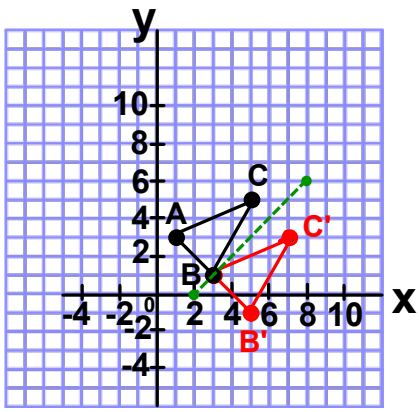
iii) Do the 2 triangles, as a whole, have rotational symmetry? If so, describe it.



Coordinates:

B' (5 , -1)

C' (7 , 3)



Coordinates:

B' (5 , -1)

C' (7 , 3)

i) The 2 triangles do not form any particular shape.

ii) They have line symmetry in the oblique line passing through points (2 , 0) and (8 , 6).

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