April 16, 2019

UNIT 7: SIMILARITY AND TRANSFORMATIONS

7.6: ROTATIONS AND ROTATIONAL SYMMETRY

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MATH 9

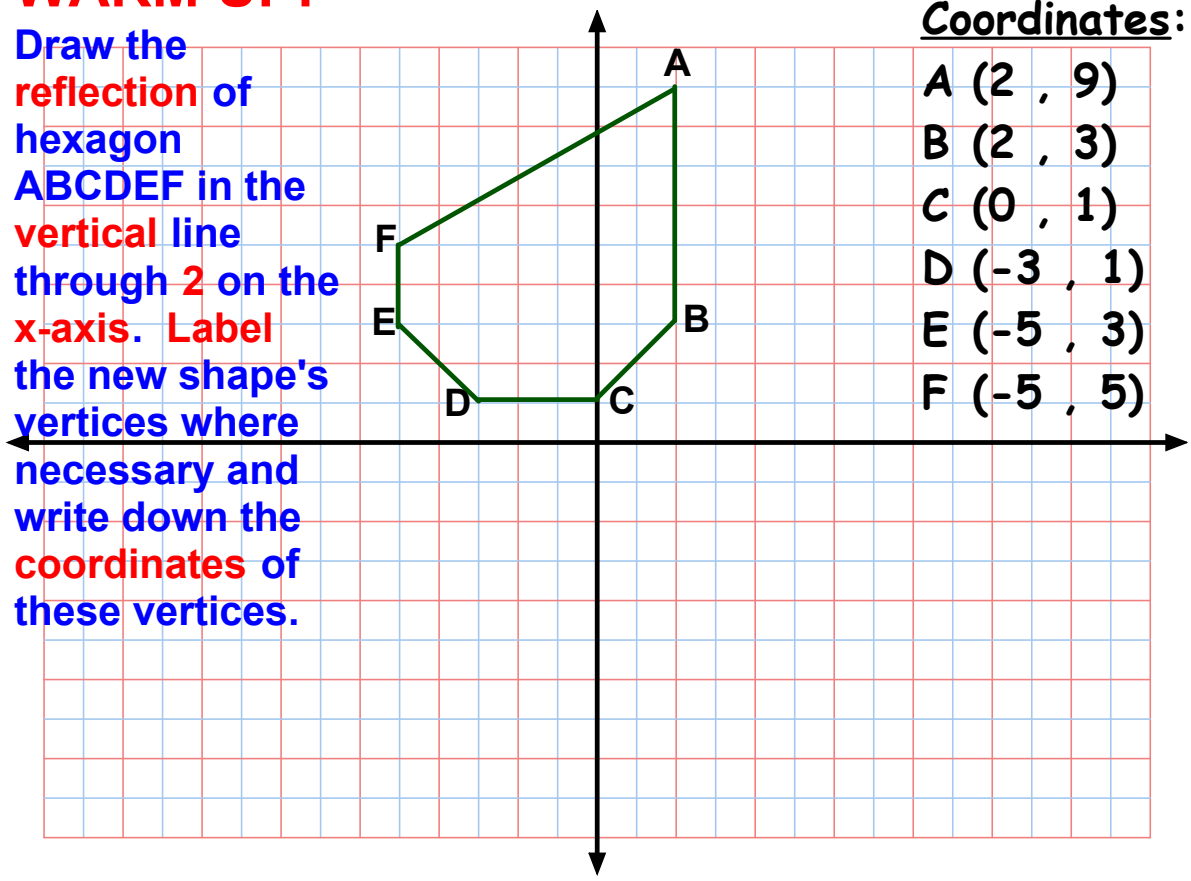
WHAT'S THE POINT OF TODAY'S LESSON?

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:

Draw the reflection of hexagon ABCDEF in the vertical line through 2 on the x-axis. Label the new shape's vertices where necessary and write down the coordinates of these vertices.

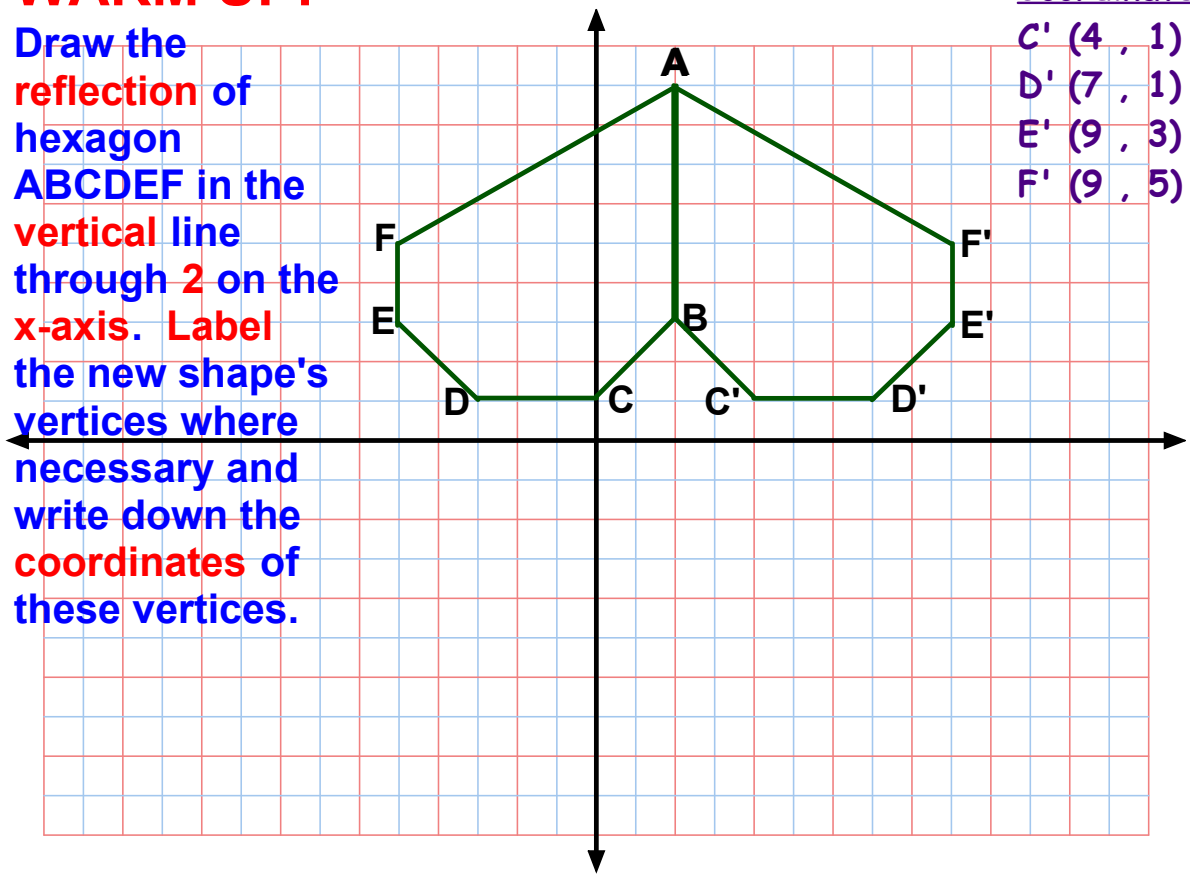


Coordinates:

A (2 , 9)
B (2 , 3)
C (0 , 1)
D (-3 , 1)
E (-5 , 3)
F (-5 , 5)

WARM UP:

Draw the reflection of hexagon ABCDEF in the vertical line through 2 on the x-axis. Label the new shape's vertices where necessary and write down the coordinates of these vertices.



Coordinates:

C' (4 , 1)
D' (7 , 1)
E' (9 , 3)
F' (9 , 5)

HOMEWORK QUESTIONS?

(pages 359, #8, #9 & #10)

ROTATIONS:

1. Rotations (like reflections) are transformations.
2. Rotations can be performed either CLOCKWISE or COUNTERCLOCKWISE.
3. A shape has ROTATIONAL SYMMETRY when it coincides with itself after a rotation of less than 360° about its centre.
4. ORDER OF ROTATION: the number of times a shape coincides with itself during a 360° rotation. It is stated like this:
   "This shape has rotational symmetry of order ___ ."
5. Angle of Rotation Symmetry $= \frac{360^\circ}{\text{the order of rotation}}$

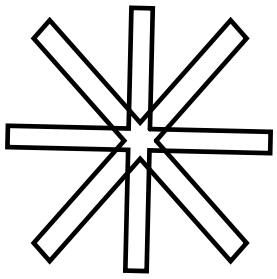
Determine if the following shapes have rotational symmetry. If so, state their order of rotation and their angle of rotation symmetry.

1.

Order = 5

angle = $\frac{360}{5}$ = 72°

2.

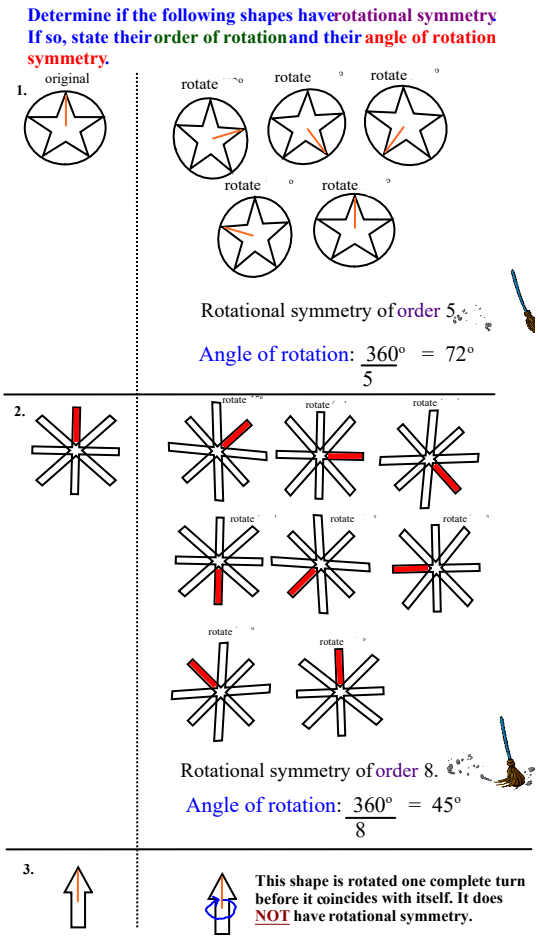


order = 8

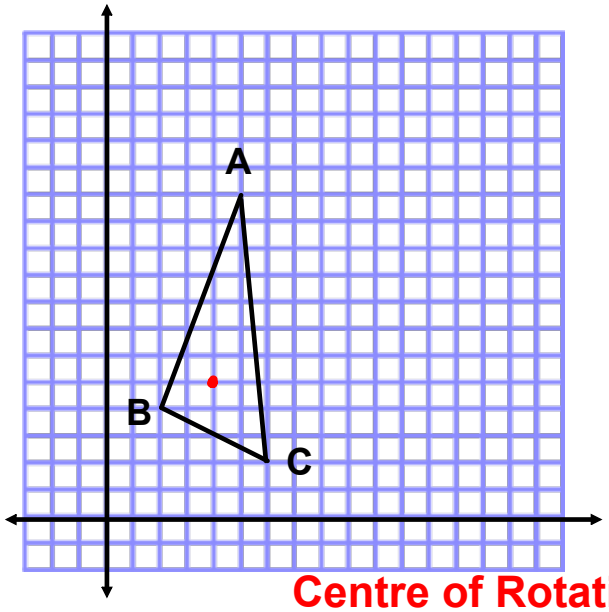
angle = $\frac{360}{8}$ = 45°

3.

No rotational Symmetry



Draw and label the rotation image of triangle ABC below after a 180° clockwise rotation about (4 , 5).



Coordinates:

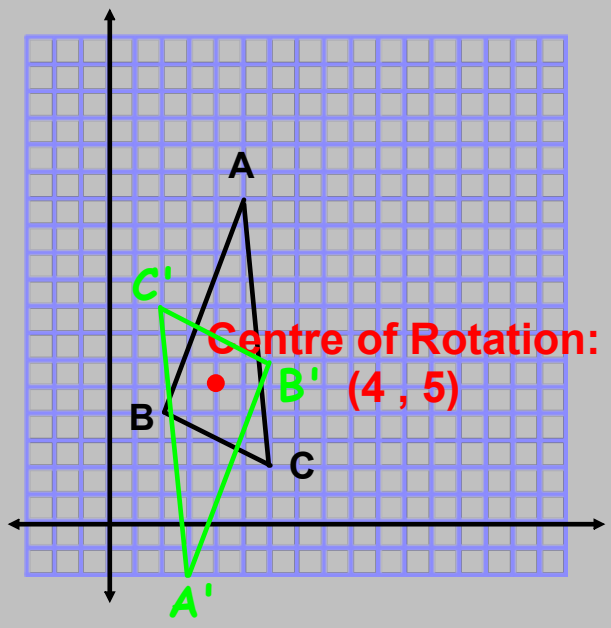
A	(5 , 12)
B	(2 , 4)
C	(6 , 2)

Centre of Rotation: (4 , 5)

DIRECTIONS:

1. Draw triangle ABC on graph paper - the coordinates of its vertices are: A (5 , 12) ; B (2 , 4) ; C (6 , 2)
2. Trace the shape on the white tissue paper you have been given. Be sure to include the point that is to be used for the centre of rotation (4 , 5).
3. Draw a vertical line segment on your tissue paper from the centre of rotation (4 , 5) up to (4 , 8) to help identify where angles are located as you rotate the tissue paper.
4. Rotate triangle ABC 180° (90° + 90°) clockwise while placing and holding the tip of your pencil on the centre of rotation (4 , 5).
5. Make note of the vertices for the rotated image on your tissue paper.
6. Draw the rotated image of triangle ABC on your graph - you may want to use a different colour to be able to distinguish the rotated image from the original.

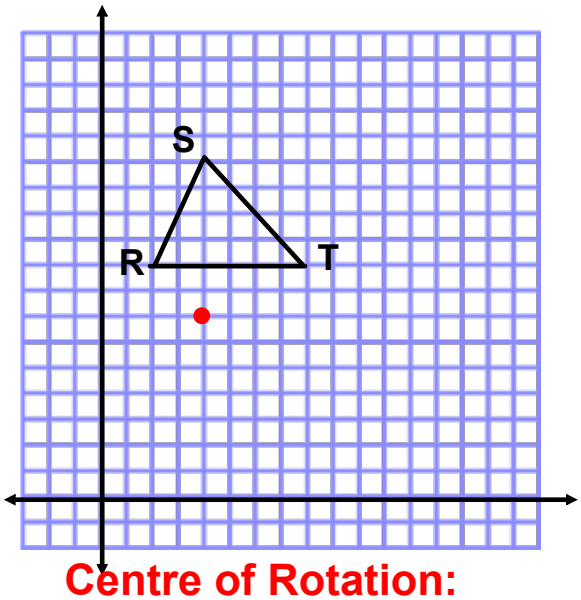
Draw and label the rotation image of triangle ABC below after a 180° clockwise rotation about (4 , 5).



Coordinates:

A' (3 , -2)
B' (6 , 6)
C' (2 , 8)

Draw and label the rotation image of triangle RST below after a 90° counterclockwise rotation about (4 , 7).



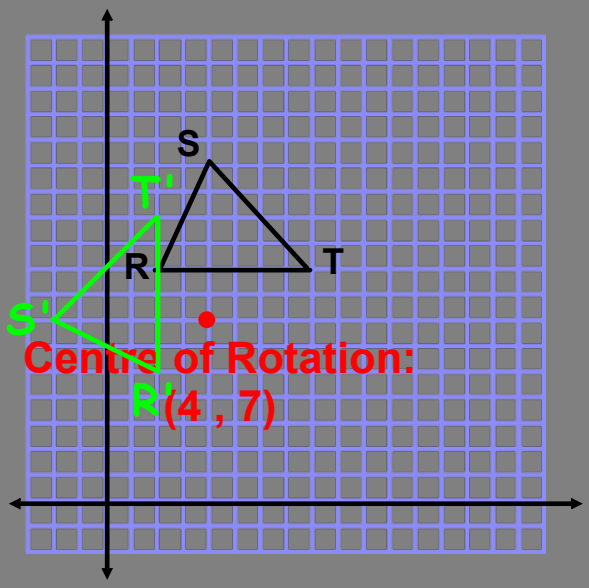
Coordinates:

R (2 , 9)
S (4 , 13)
T (8 , 9)

DIRECTIONS:

1. Draw triangle RST on graph paper - the coordinates of its vertices are: R (2 , 9) ; S (4 , 13) ; T (8 , 9)
2. Trace the shape on the white tissue paper you have been given. Be sure to include the point that is to be used for the centre of rotation (4 , 7).
3. Draw a vertical line segment on your tissue paper from the centre of rotation (4 , 7) up to (4 , 10) to help identify where angles are located as you rotate the tissue paper.
4. Rotate triangle RST 90° counterclockwise while placing and holding the tip of your pencil on the centre of rotation (4 , 7).
5. Make note of the vertices for the rotated image on your tissue paper.
6. Draw the rotated image of triangle RST on your graph - you may want to use a different colour to be able to distinguish the rotated image from the original.

Draw and label the rotation image of triangle RST below after a 90° counterclockwise rotation about (4 , 7).



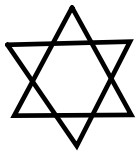
Coordinates:

R' (2 , 5)
S' (-2 , 7)
T' (2 , 11)

WARM UP:

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

1.

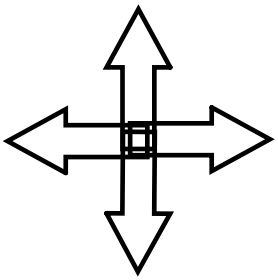


order = 6

angle = $\frac{360}{6}$

= 60°

2.



order = 4

angle = $\frac{360}{4}$

= 90°

CONCEPT REINFORCEMENT:

***MMS9*:**

PAGE 365: #4, #5, #6, & #7

PAGE 366: #8, #9 & #12

PAGE 367: #14 & #15

4 a) angle = $\frac{360}{3}$

= 120°

5. a) order = $\frac{360°}{60°}$

= 6