MAY 2, 2016

UNIT 7: SIMILARITY AND TRANSFORMATIONS

7.5: REFLECTIONS AND LINE SYMMETRY

M. MALTBY INGERSOLL
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:

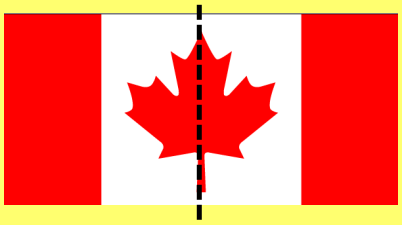
* **classify a given set of 2-D shapes or designs according to the number of lines of symmetry**
* **complete a 2-D shape or design given one half of the shape or design and a line of symmetry**
* **determine if a 2-D shape or design has rotational symmetry about the point at the centre of the shape 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???

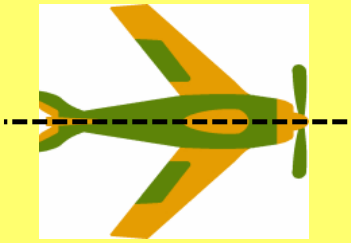
In today's lesson, we will work on the following achievement indicators for SCO SS5:

* **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**

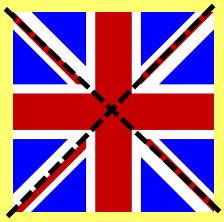
Shapes may show symmetry when folded:



vertically

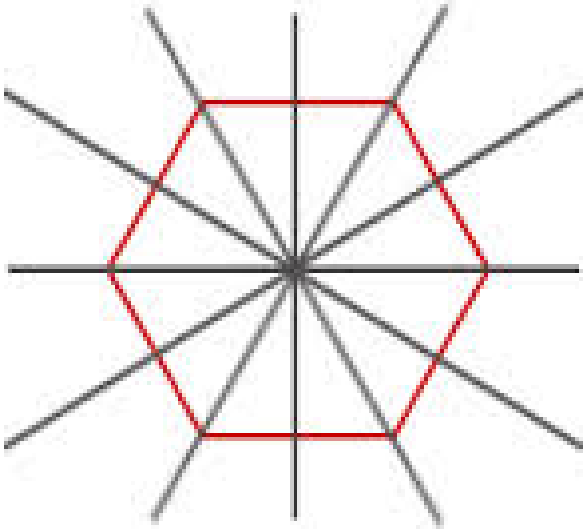


horizontally



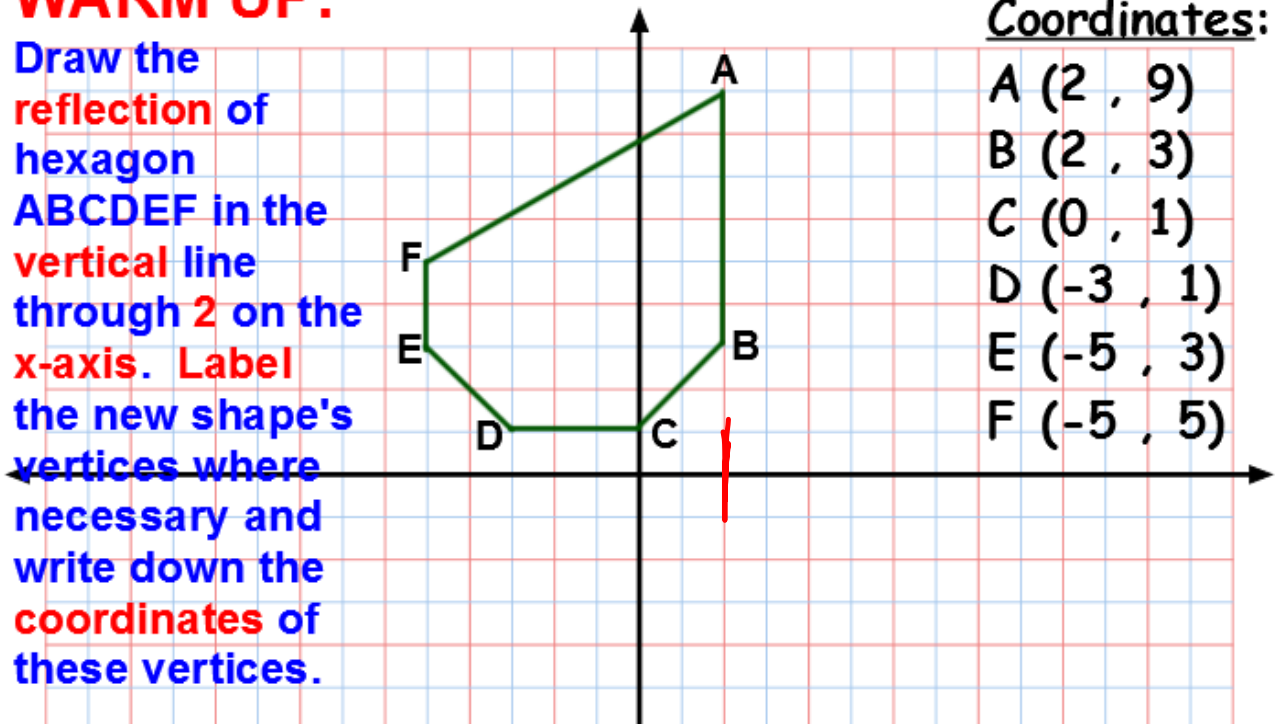
diagonally

The 6 lines of symmetry in a regular hexagon:



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.

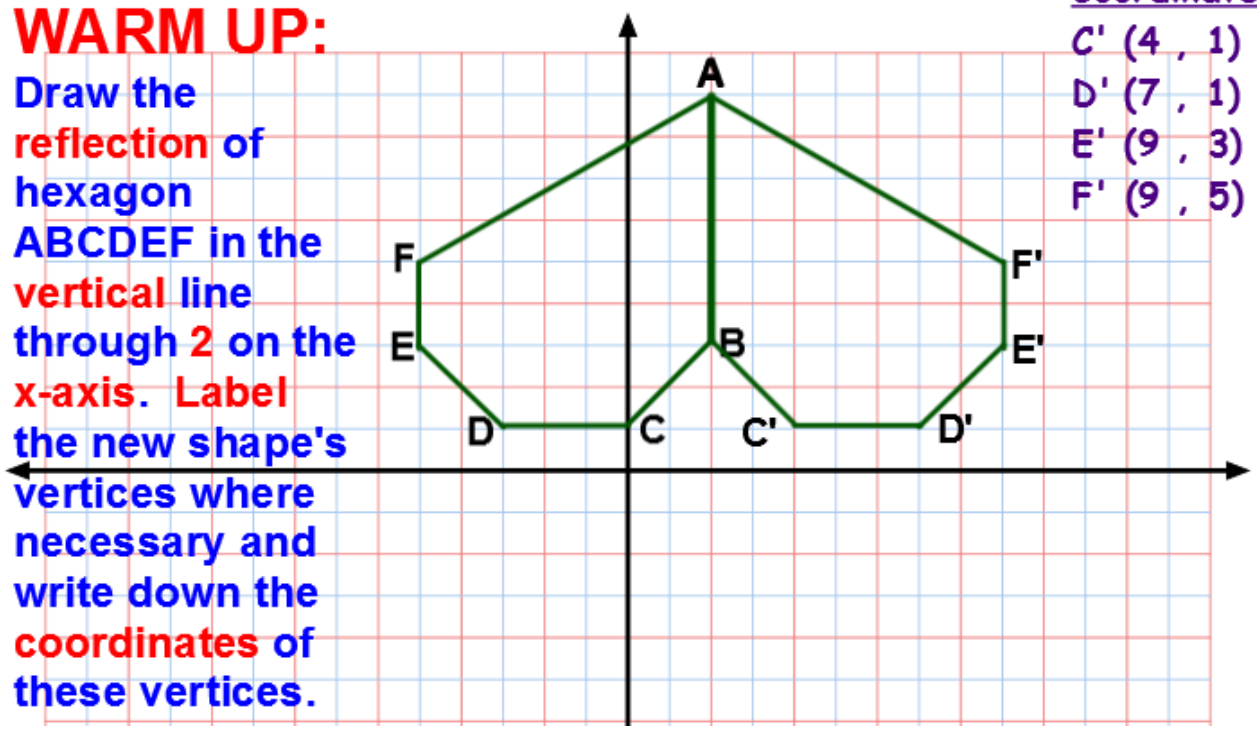


Coordinates:

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

WARM UP:

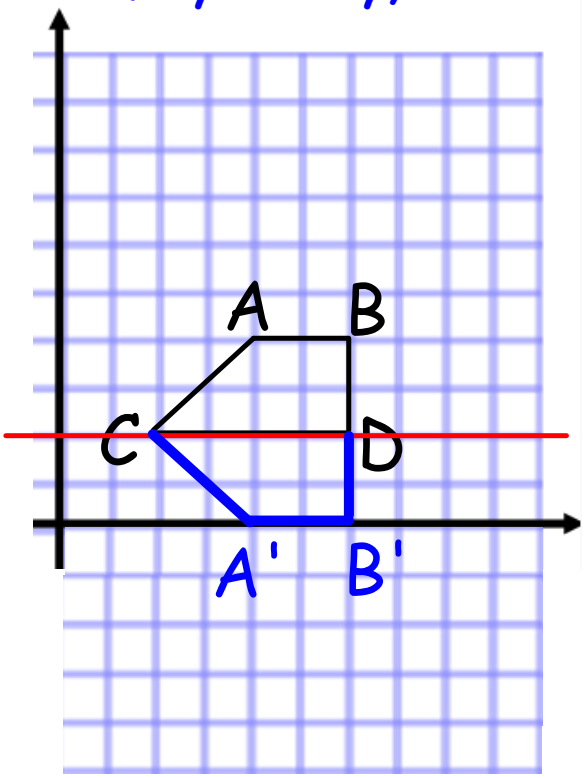
Draw the reflection of hexagon ABCDEF in the vertical line through 2 on the x-axis. Label the new shape's vertices where necessary and write down the coordinates of these vertices.



Coordinates:

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

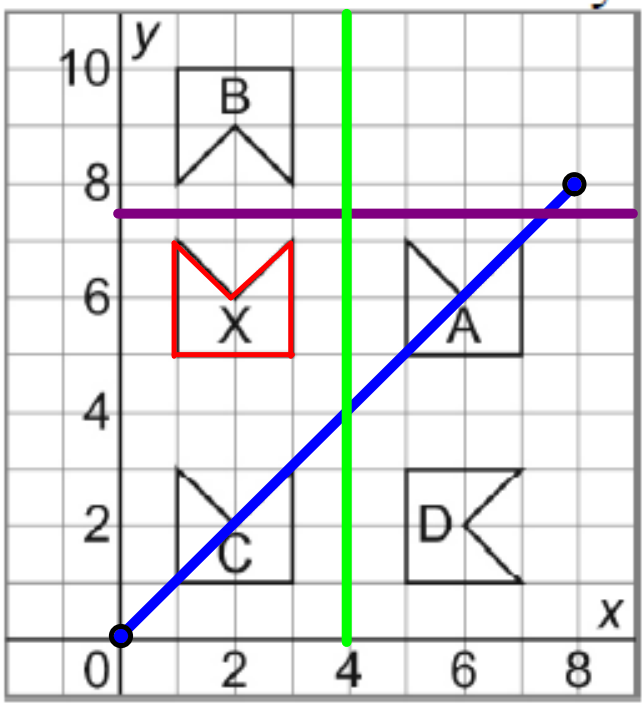
Copy the shape on graph paper. Use the red line as a line of symmetry, and complete the other half.



Coordinates:

A	(4 , 4)
B	(6 , 4)
C	(2 , 2)
D	(6 , 2)
A'	(4 , 0)
B'	(6 , 0)

Identify the images that are related to the shape "X" by a line of reflection. Describe the symmetry in each case.



A: the reflection image in the vertical line through 4 on the *x*-axis

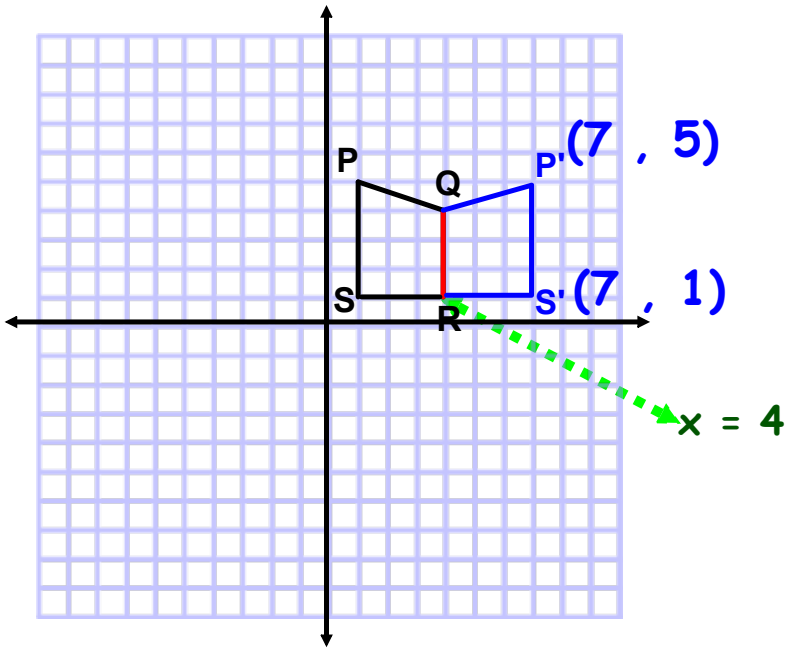
B: the reflection image in the horizontal line through 7.5 on the *y*-axis

C: not related to "X" by line symmetry

D: the reflection image in the oblique line through (0, 0) and (8, 8)

Quadrilateral PQRS is part of a larger shape.

a) Draw a reflection in the vertical line through 4 on the x-axis.



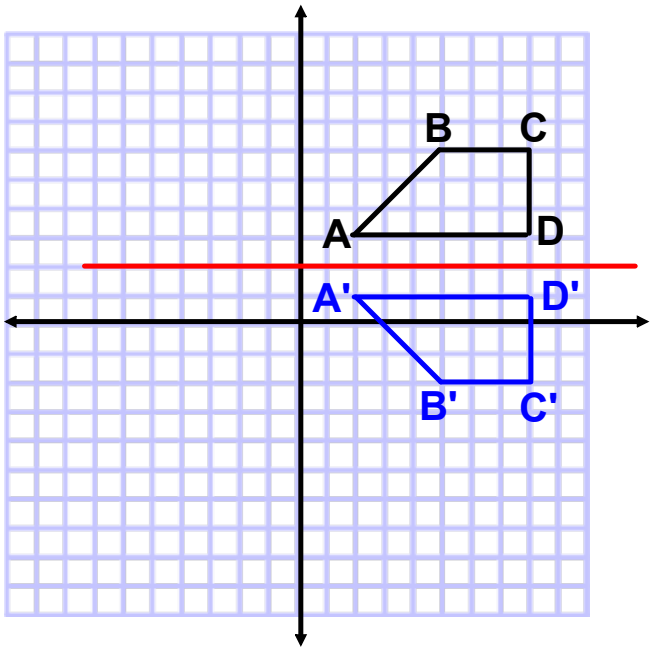
b) Write the coordinates of the vertices of the larger shape.

P (1 , 5) ; Q (4 , 4) ; P' (7 , 5) ; S (1 ,1) ; and S' (7 , 1)

c) Describe the larger shape and its symmetry.

It is a pentagon (P Q P' S' S) with a line of symmetry through QR.

a) Draw a reflection of quadrilateral ABCD in the horizontal line through 2 on the y-axis.



Coordinates:

A	(2 , 3)
B	(5 , 6)
C	(8 , 6)
D	(8 , 3)
A'	(2 , 1)
B'	(5 , -2)
C'	(8 , -2)
D'	(8 , 1)

b) Write the coordinates of the image of ABCD.
(See above.)

c) Describe the image of ABCD.
The image of ABCD is a still a quadrilateral (A'B'C'D').

CONCEPT REINFORCEMENT:

MMS9:
PAGE 357: #3
PAGE 358: #5
PAGE 359: #8, #9 & #10