Describe what it means for a figure to be **symmetric**.

LESSON 6.1

Symmetry and Transformations

COMMON CORE STATE STANDARDS		
Applied	**Developed**	**Introduced**
8.G.2	G.CO.2	
8.G.3	G.CO.3	
G.CO.4	G.CO.6	

6.1 Symmetry and Transformations

a. I can use rigid transformations to describe symmetry (reflectional, rotational and translational).
b. I can identify the line of symmetry and point of symmetry.

LESSON 6.1

Symmetry and Transformations

Symmetry is found in all cultures. It is ubiquitous in the decorative arts and historically the cornerstone of architectural design. Symmetry can be found in music, poetry, and dance. Symmetry is even essential to the structure of the DNA molecule.

Japanese Unit Origami Box

Pacific Northwest Art

Navajo Rug Design

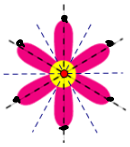
If a figure can be reflected over a line in such a way that the resulting image coincides with the original, then the figure has **reflectional symmetry**. The reflection line is called the **line of symmetry**. The rug shown has two lines of symmetry, thus two-fold reflectional symmetry.

Reflectional Symmetry: A line that can be drawn through a figure so that one half of the figure is a reflection of the other half.

Line of Symmetry: The line of reflection in a figure with reflectional symmetry.

Determine whether the following have Reflectional Symmetry. If yes, draw the line(s) of symmetry.

1.

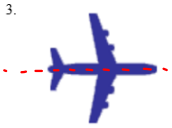


Reflectional Symmetry: (Yes) No

2.

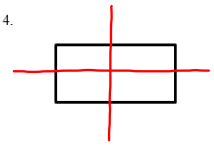
Reflectional Symmetry: (Yes) No

3.



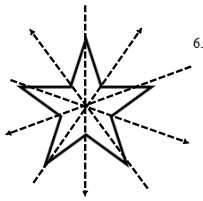
Reflectional Symmetry: (Yes) No

4.



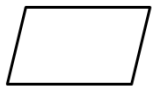
Reflectional Symmetry: (Yes) No

5.



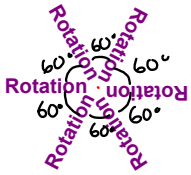
Reflectional Symmetry: (Yes) No

6.



Reflectional Symmetry: Yes (No)

https://www.geogebra.org/m/zuyPxxHx



Rotational Symmetry: A figure can be rotated a certain angle measurement about a point such that its rotated image coincides with the original before rotating a full 360°.

Overlap

Point of Symmetry: The point that a figure with rotational symmetry is rotated about.

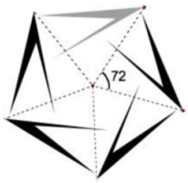
Order: The number of times a figure fits onto itself in one complete rotation.

Magnitude: The smallest angle measurement needed to rotate a figure so it coincides with the original.

The figure at the right has the following order and magnitude

Order: 5

Magnitude: 72°



Discuss with your partner/group how to find the order and magnitude of a figure with rotational symmetry.

To find order… See how many times the figure can rotate onto itself within 360°.

To find magnitude… Divide 360° by the order.

Determine whether the following have Rotational Symmetry. If yes, indicate the point of symmetry and state the order and magnitude.

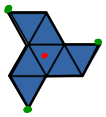
7.

Rotational Symmetry: (Yes) / No
Order: 2
Magnitude: 180°

8.

Rotational Symmetry: (Yes) / No
Order: 4
Magnitude: 90°

9.



Rotational Symmetry: (Yes) / No
Order: 3
Magnitude: 120°

10.

Rotational Symmetry: Yes (No)
Order: _____
Magnitude: _____

11.

Rotational Symmetry: (Yes) / No
Order: 6
Magnitude: 60°

12.

Rotational Symmetry: Yes (No)
Order: _____
Magnitude: _____

TranslationTranslationTranslationTranslation

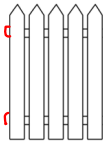
Translational Symmetry: The result of sliding a design repeatedly by the same distance and direction.

Determine the type(s) of symmetry found in the figures below.

13.

Reflectional Symmetry: Yes (No)
Rotational Symmetry: (Yes) / No
Translational Symmetry: (Yes) / No

14.



Reflectional Symmetry: (Yes) / No
Rotational Symmetry: Yes (No)
Translational Symmetry: (Yes) / No

15.

Reflectional Symmetry: (Yes) / No
Rotational Symmetry: (Yes) / No
Translational Symmetry: (Yes) / No

Vertical - ↕

Horizontal - ↔

6.1 Symmetry and Transformations

a. I can use rigid transformations to describe symmetry (reflectional, rotational and translational).
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Homework: 6.1 Symmetry Homework