

Transformations – Symmetry

G.CO.A.3

Notes Section T.2

Name _____

What does it mean to carry a shape onto itself?

Symmetry

What types of symmetry are there?

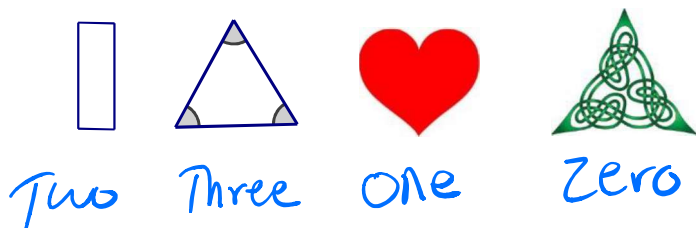
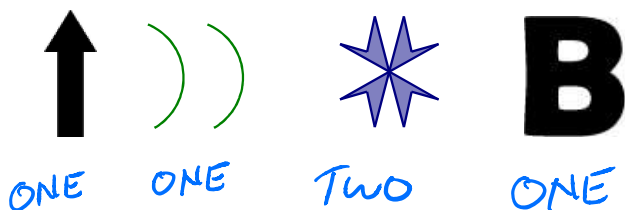
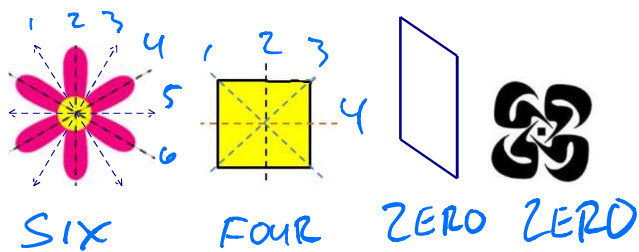
Rotational, Point, Line (Reflectional)

LINE SYMMETRY (or REFLECTIONAL SYMMETRY)

What is the definition of Line Symmetry?

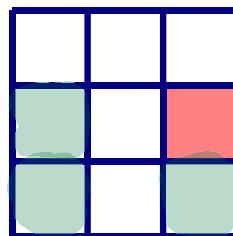
A figure that can be mapped onto itself by a reflection

How many lines of symmetry does each figure have?

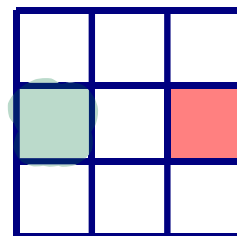


Shade each figure so it has the indicated number of line symmetries.

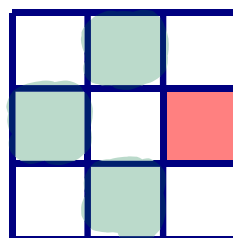
Exactly 1 Line of Symmetry



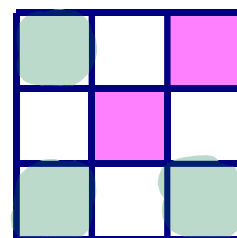
Exactly 2 lines of symmetry



Exactly 4 lines of symmetry



Exactly 4 lines of symmetry



What are the characteristics of a polygon produces the maximum amount of symmetry for its number of sides?

*The polygon is regular.
(All sides \cong and all angles \cong)*

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ROTATIONAL SYMMETRY

A geometric figure has rotational symmetry if the figure is the image of itself under a rotation about a point through any angle whose measure is strictly between 0° and 360° . 0° and 360° are excluded from counting as having rotational symmetry because it represents the starting position.

ANGLE OF ROTATION - When a shape has rotational symmetry we sometimes want to know what the angle of rotational symmetry is. To determine this we determine the **SMALLEST** angle through which the figure can be rotated to coincide with itself. This number will always be a factor of 360° .

ORDER OF ROTATION SYMMETRY -- The number of positions in which the object looks exactly the same is called the **order** of the symmetry. When determining order, the last rotation returns the object to its original position.

Order 1 implies no true rotational symmetry since a full 360 degree rotation was needed.

Determine the angle or rotation and order of rotation.



Angle = 120°

Order = 3



Angle = 360°

Order = 1



Angle = 120°

Order = 3



Angle = 180°

Order = 2



Angle = 120°

Order = 3



Angle = 120°

Order = 3



Angle = 72°

Order = 5

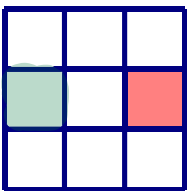


Angle = 360°

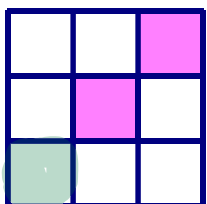
Order = 1

Shade each figure so it has the indicated angle or rotation and order of rotation.

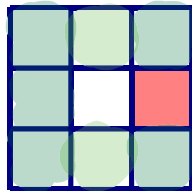
Angle = 180° , Order 2



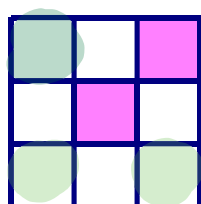
Angle = 180° , Order 2



Angle = 90° , Order 4



Angle = 90° , Order 4



POINT SYMMETRY

Point Symmetry exists when a figure is built around a point such that every point in the figure has a matching point that is the **SAME DISTANCE** from the central point but **IN THE OPPOSITE DIRECTION**.

A simple test to determine whether a figure has point symmetry is to turn it upside-down and see if it looks the same. A figure that has point symmetry is unchanged in appearance by a 180 degree rotation.

You will notice that the point of rotation is a midpoint between every point and its image.

