

Lesson Plan For Common Core 8

TRANSFORMATIONS OF THE PLANE

STANDARD: CCSS.MATH.CONTENT.HSG.CO.A.2

Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

TASK: Go to <https://www.geogebra.org> click on the + sign and *Start Geogebra*. You will be learning about the basic transformations of the plane. I will demonstrate how to use the tools to perform each of the transformations.

Translations

Use the polygon tool to create one polygon with each of the number of sides listed and translate it using the translation tool. Fill in the table drawing the vector for the translation, the original image of the polygon, the final position of the polygon in the middle column, and what happened to the polygon in the last column:

Number of Sides	Sketch of Polygon (Before and After)	What Effect Did The <i>Translation</i> Have?
3		
3		

Number of Sides	Sketch of Polygon (Before and After)	What Effect Did The <i>Translation</i> Have?
5		
6		

In order to talk about a translation we need to know _____

Now in your own words describe what you think a translation is based on your observations:

A *translation* is _____

Rotations

Use the polygon tool to create one polygon with each of the number of sides listed and rotate it using the rotate about a point tool. Fill in the table giving the original image of the polygon, the final position of the polygon, and the angle specified in the middle column, and what happened to the polygon in the last column:

Number of Sides	Sketch of Polygon (Before and After)	What Effect Did The <i>Rotation</i> Have?
3		
4		
5		
6		

In order to talk about a rotation we need to know _____

Now in your own words describe what you think a rotation is based on your observations:

A *Rotation* is _____

Reflections

Use the polygon tool to create one polygon with each of the number of sides listed and reflect it using the reflect about a line tool. Fill in the table giving the original image of the polygon, the final position of the polygon, and the line of reflection in the middle column, and what happened to the polygon in the last column:

Number of Sides	Sketch of Polygon (Before and After)	What Effect Did The <i>Reflection</i> Have?
3		
4		

Number of Sides	Sketch of Polygon (Before and After)	What Effect Did The <i>Reflection</i> Have?
5		
6		

In order to talk about a reflection we need to know _____

Now in your own words describe what you think a reflection is based on your observations:

A *Reflection* is _____

Dilations

Use the polygon tool to create one polygon with each of the number of sides listed and dilate it using the dilate from point tool. Fill in the table giving the original image of the polygon, the final position of the polygon, and the dilation factor in the middle column, and what happened to the polygon in the last column:

Number of Sides	Sketch of Polygon (Before and After)	What Effect Did The <i>Dilation</i> Have?
3		
4		

Number of Sides	Sketch of Polygon (Before and After)	What Effect Did The <i>Dilation</i> Have?
5		
6		

In order to talk about a dilation we need to know _____

Now in your own words describe what you think a dilation is based on your observations:

A *Dilation* is _____

TASK: Go back and look at your sketches for each of the transformations. Place a yes or no in each box stating whether or not the transformation preserves lengths and angles!!

	Preserve Angles??	Preserve Lengths??
Translations		
Rotations		
Reflections		
Dilations		

Transformations of the Plane Notes

A *Transformation* of the plane is _____

Five Transformations are:

1. _____

2. _____

3. _____

4. _____

5. _____

A *translation* is _____

A *rotation* is _____

A *reflection* is _____

A *glide reflection* is _____

A *dilation* is _____

How do we notate these four transformations?

A *translation* is notated by _____

A *rotation* is notated by a _____

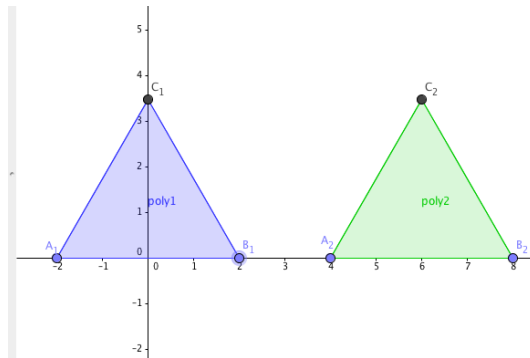
A *reflection* is notated by _____

A *glide reflection* is notated by _____

A *glide reflection* is notated by _____

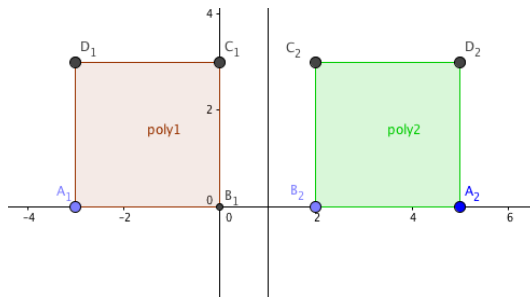
For each of the following, describe what type of transformation has taken place. For rotations please give the center of rotation and the angle, for reflections please give the line of reflection, and for translations, please give the vector that corresponds to the translation.

A)



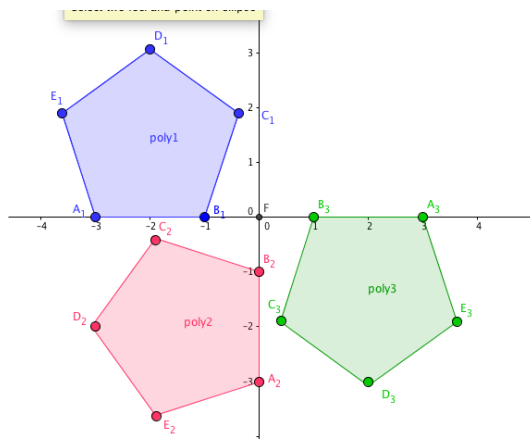
TRANSFORMATION:

B)



TRANSFORMATION:

C)

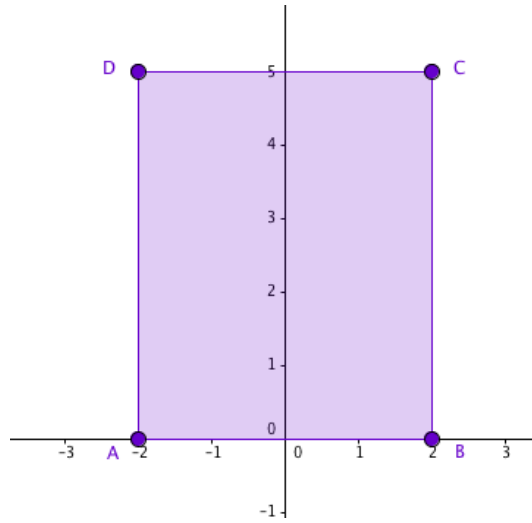


TRANSFORMATION:

CCSS.MATH.CONTENT.HSG.CO.A.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

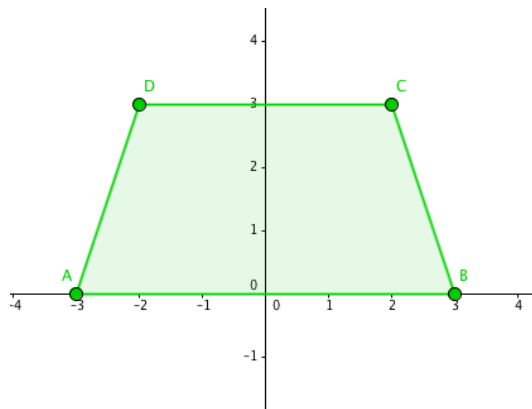
Please take each of the following figures and determine if a translation, reflection, or rotation will carry it onto itself. For rotations list the specific angle measure/s that will carry the object onto itself. For reflections please list the equation of the line that will carry the object to itself.

A)



CARRY OBJECT TO ITSELF:

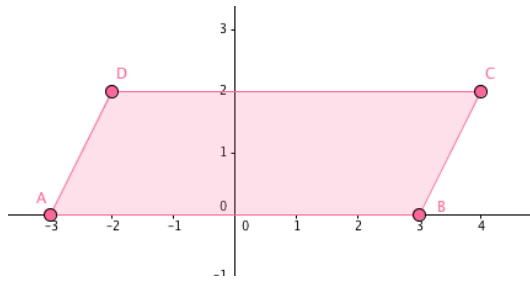
B)



CARRY OBJECT TO ITSELF:

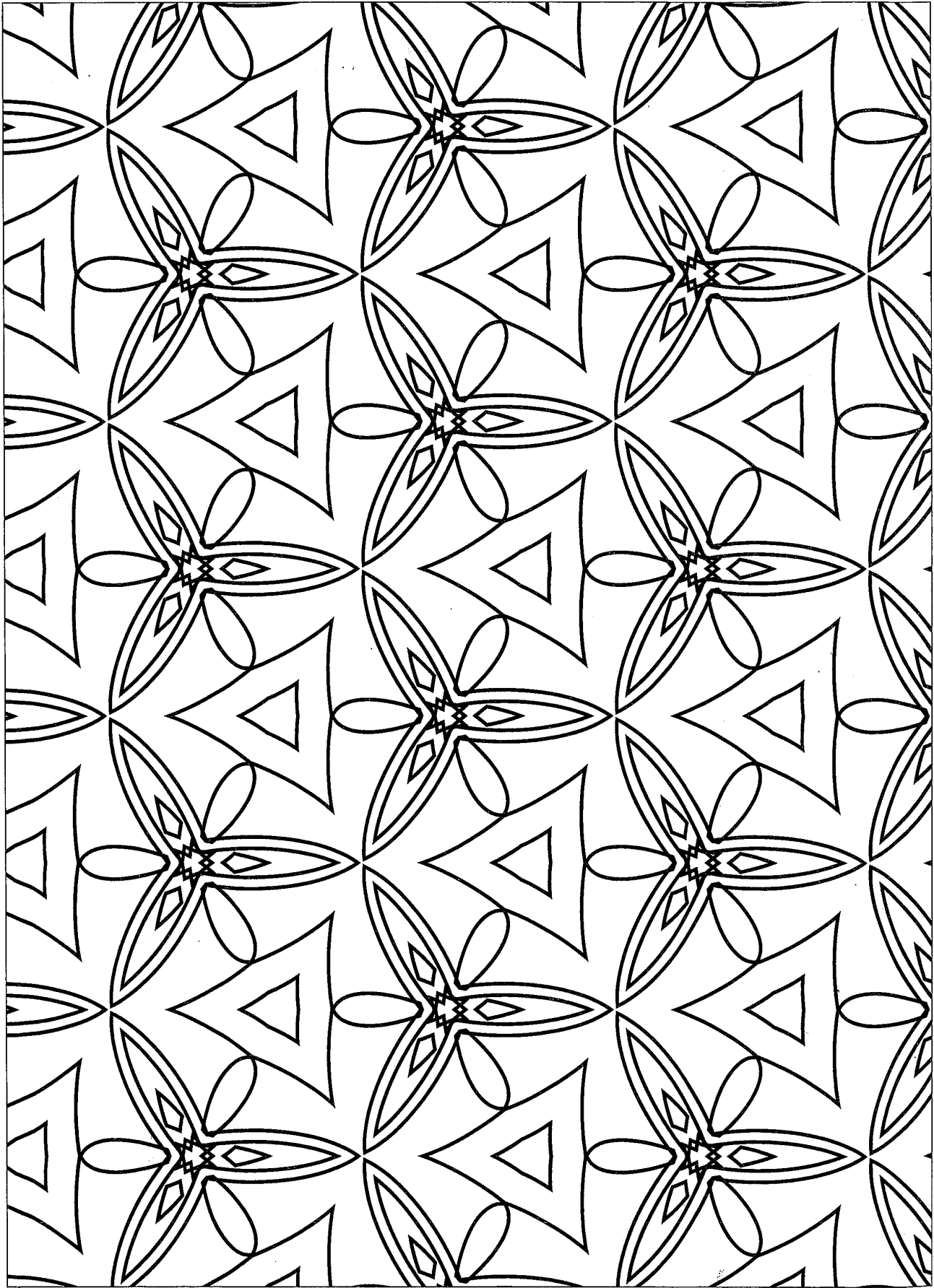
C)

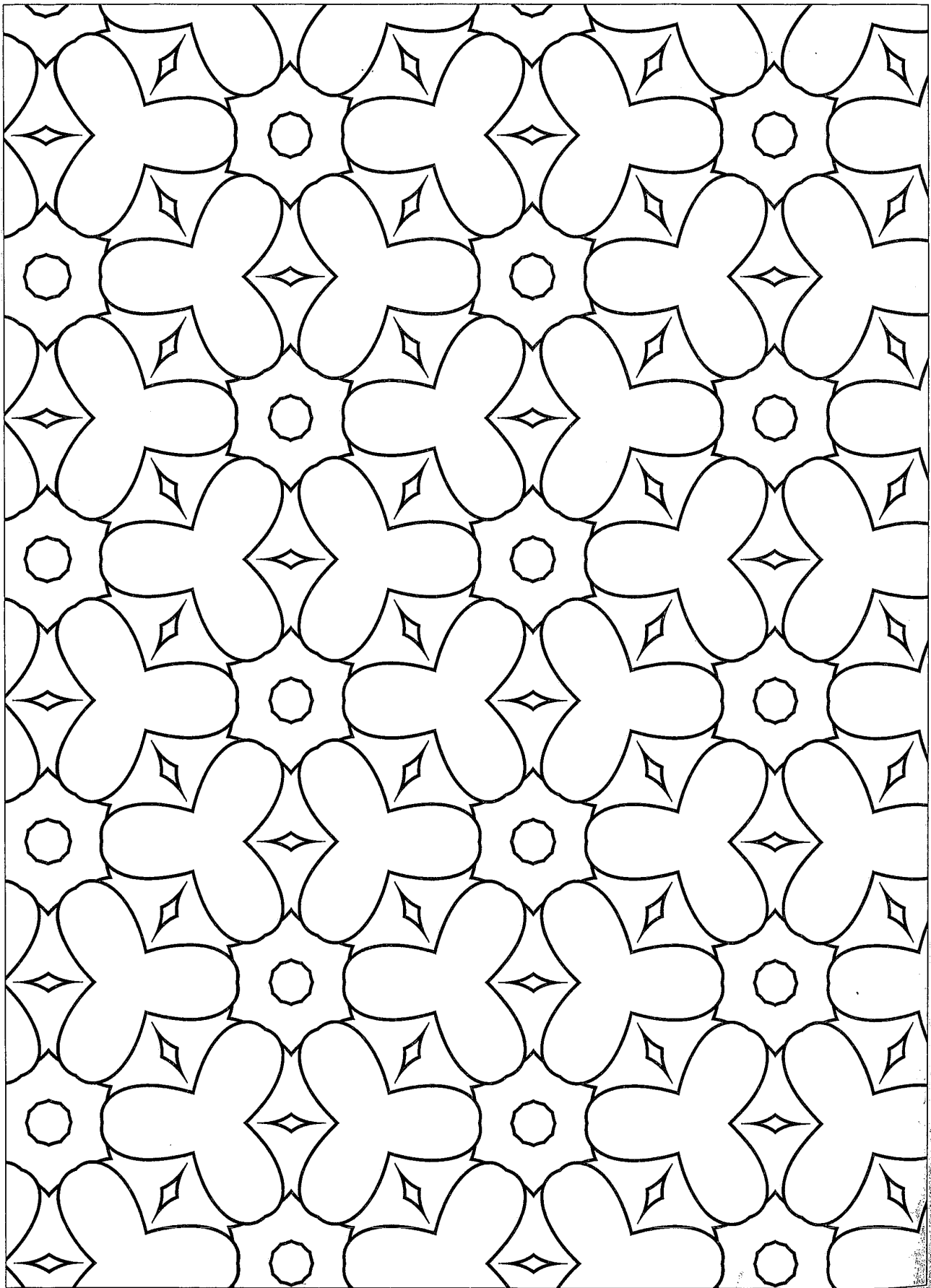
CARRY OBJECT TO ITSELF:

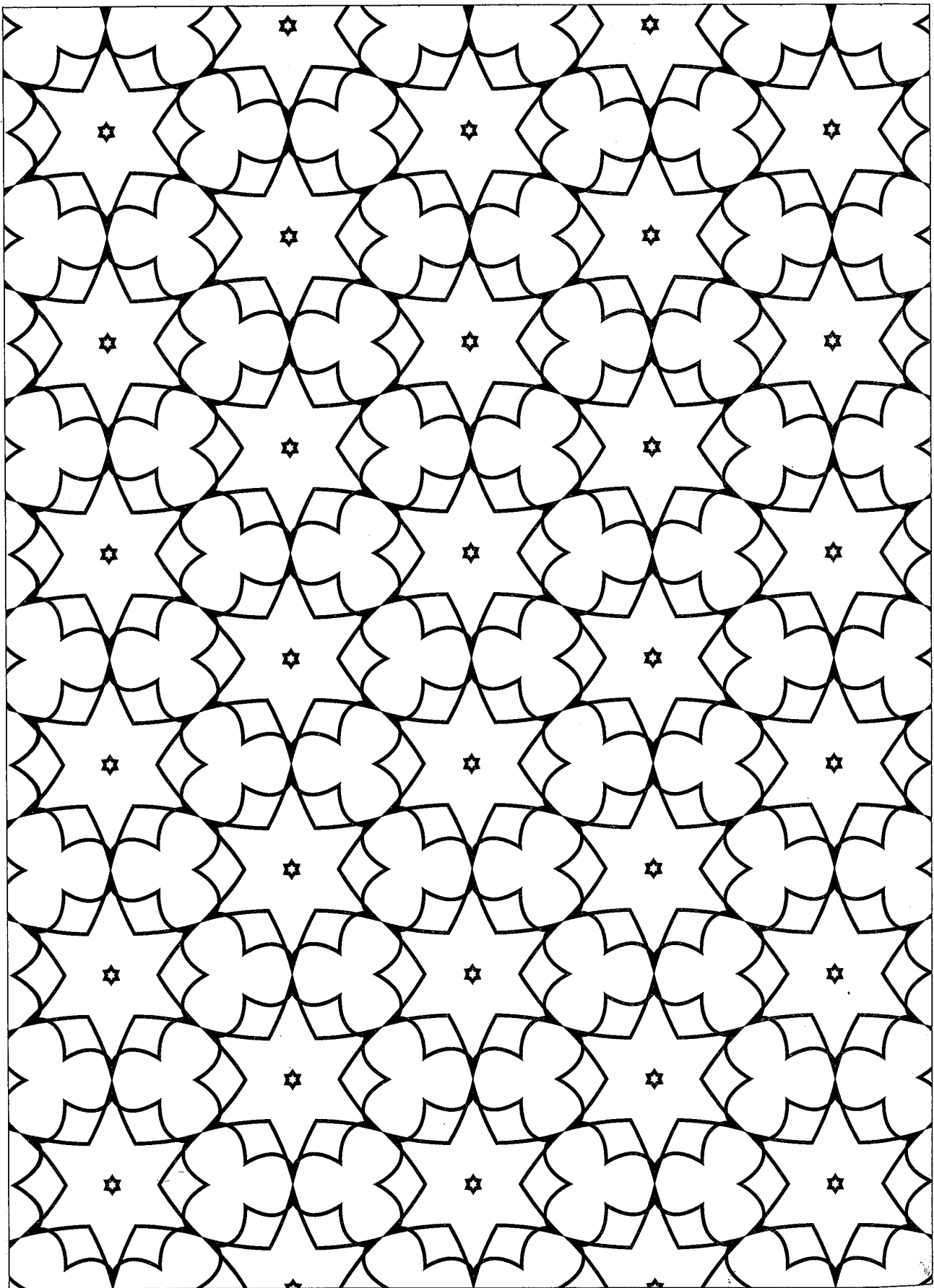


A *symmetry* is: _____

For each of the following shapes/objects, please list the symmetries:







HOMEWORK

Name _____

TASK: Your job for this assignment is to take magazines and find interesting objects and shapes and write out the set of symmetries for the objects. Please provide 5 different shapes from magazines and glue them to this paper and then write the symmetries next to them.