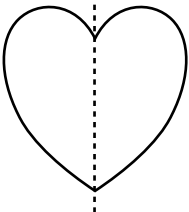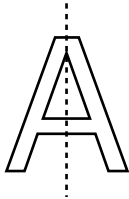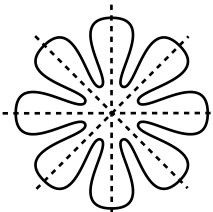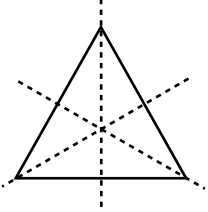# Line Symmetry

Symmetry: Symmetry is the property of a shape that allows it to be carried onto itself either by by reflection or rotation.
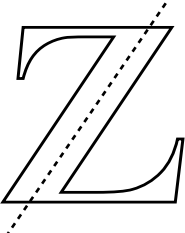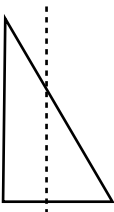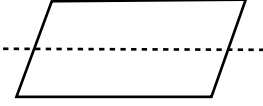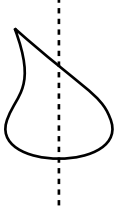
The first kind of symmetry is referred to as Line Symmetry or Linear Symmetry. Line Symmetry occurs when two halves of a shape can be reflected onto each other across a line. We call this line, a line of reflection. Sometimes it is also called a line of symmetry or the axis of symmetry.

Line Symmetry: A figure in the plane has line symmetry if and only if the figure can be mapped onto itself by a reflection through a line.

Line of Reflection: The line through which a figure can be reflected such that it is carried onto itself. This is often called a **Line of Symmetry** or the **Axis of Symmetry**.

one line of reflection	one line of reflection	4 lines of reflection	3 lines of reflection

The next few examples do not have line symmetry

no line symmetry	no line symmetry	no line symmetry	no line symmetry

A nice way to decide if a shape has line symmetry is to trace the shape and the line of reflection on patty paper or tracing paper, and flip the paper over. When you match up the line of reflection if it doesn't match the original figure then it doesn't have line symmetry.

If you don't happen to have patty paper or tracing paper you can try folding your paper along the line of reflection to see if the two halves of the shape match up.

Go ahead and try one of these methods on the shapes above.

Directions: Look at the shape and the dotted line. Use patty paper or the folding technique to decide if the dotted line is a line of reflection and circle "yes" or "no".

1

Yes   no

2

Yes   no

3

Yes   no

4

Yes   no

5

Yes   no

6

Yes   no

7

Yes   no

8

Yes   no
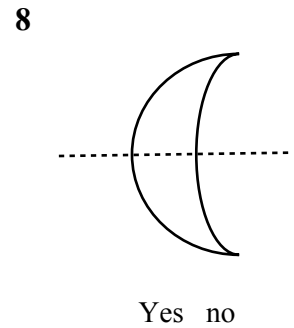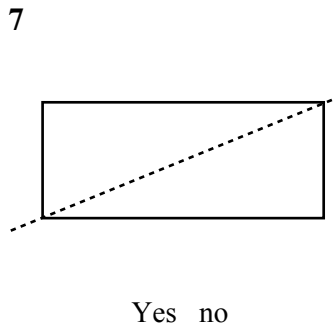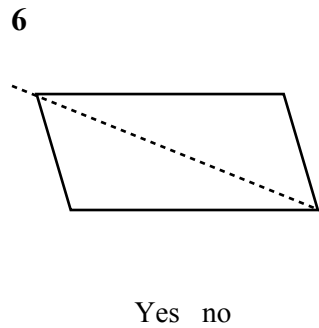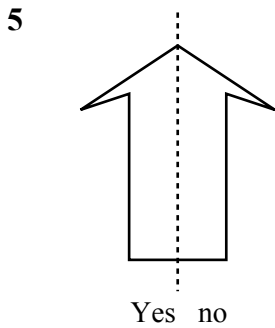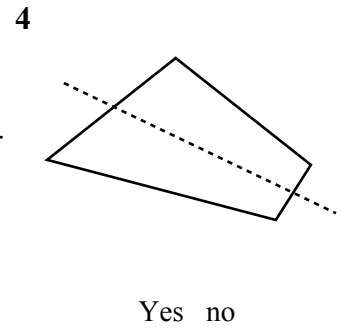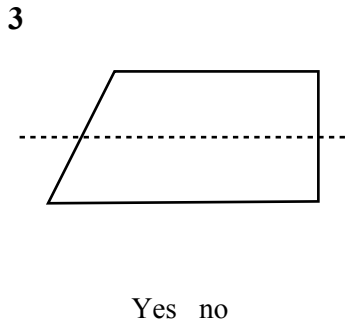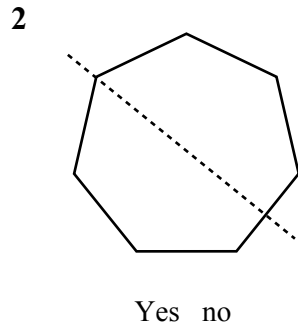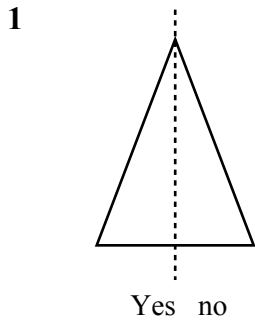
9 Were you surprised by #6 and/or#7? Is there another way to draw lines of reflection for these shapes? Try to do it below an justify your answer by tracing or folding.

Directions: Decide if each figure below has line symmetry. If the figure does, draw all the possible lines of reflection. If it does not have line symmetry write "no line symmetry".

10

11

12

13

14

15

16

17

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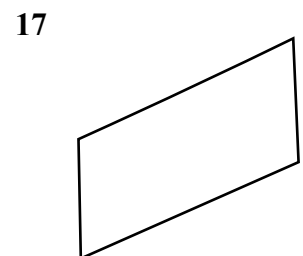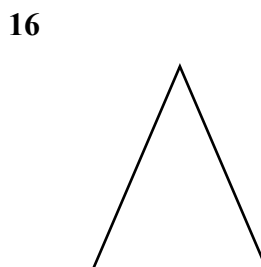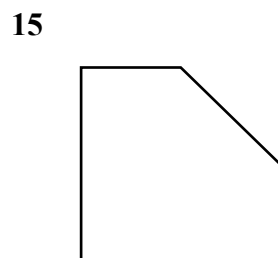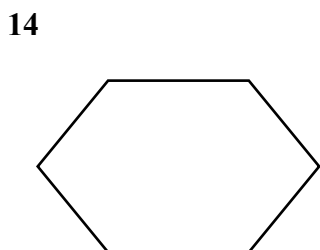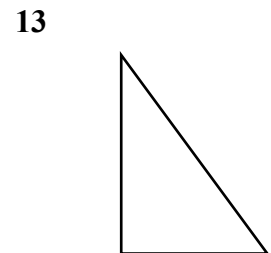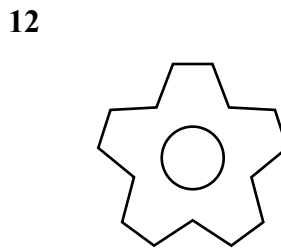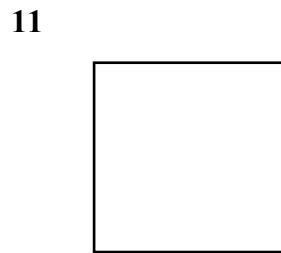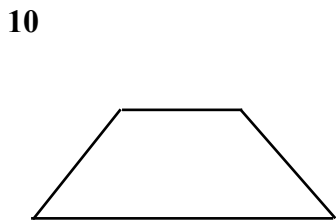
Name:_____ Date:_____ Period:_____ Score:_____

A **Regular Polygon** is a polygon that is both equilateral and equiangular. That is to say that all of its sides are the same length, and all of its angles are the same measure.

Directions: For each regular polygon, draw in all the possible lines of symmetry. Then, record the number of sides and lines of symmetry the figure has.
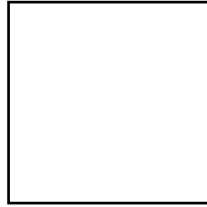
1 equilateral triangle
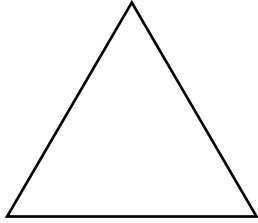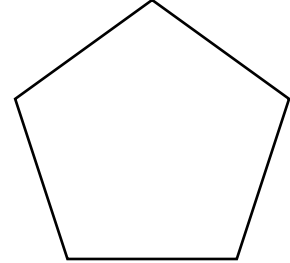
Sides:_____

Lines of reflection: _____

2 square

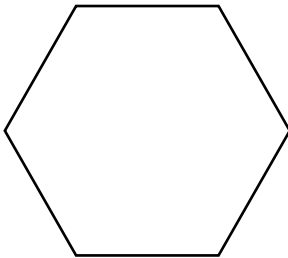Sides:_____

Lines of reflection: _____

3 regular pentagon
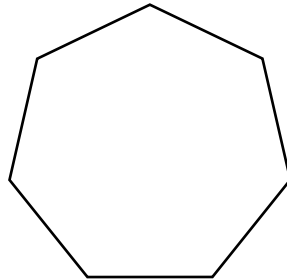
Sides:_____

Lines of reflection: _____

4 regular hexagon

Sides:_____

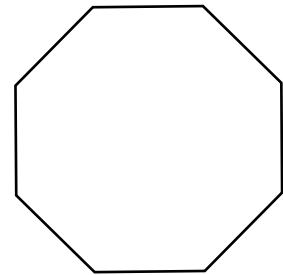Lines of reflection: _____

5 regular heptagon

Sides:_____

Lines of reflection: _____

**6** regular octagon

Sides:_____

Lines of reflection: _____

7 What is the relationship between the number of sides a regular polygon has and the maximum number of lines of reflection it can have?

8 Use this idea to determine how many lines of reflection a regular decagon (ten sides) has without drawing one. Explain how you found your answer.

9 How many lines of reflection does a regular 38-gon have? Explain how you found your answer.

Name:_____ Date:_____ Period:_____ Score:_____

1 Look at the regular hexagon below. How can you alter the hexagon so that it only has two lines of reflection instead of 6? Draw the hexagon (you may need to make it irregular).
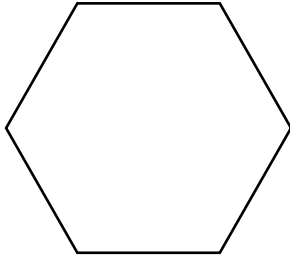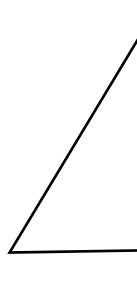
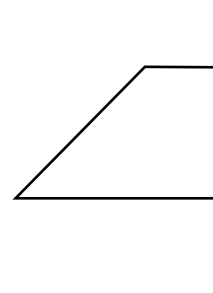**Directions:** Below are 3 shapes that are half drawn and have a line of reflection. Draw the other half of each shape.
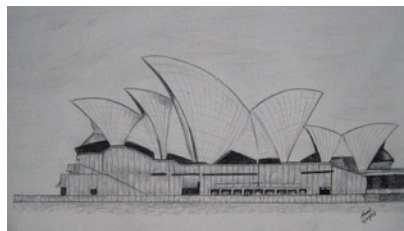
2
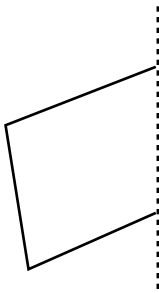
3

4

Directions: Which objects below have line symmetry? Draw in all possible lines of reflection for each.
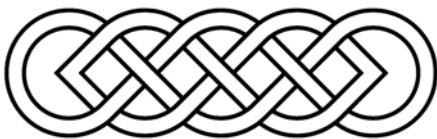
5 snowflake

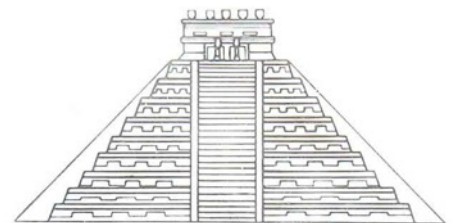**6** Sydney Opera House

7 Taj Mahal

8 Celtic knot

9 Eiffel Tower

10 Chichen Itza

11 what are some objects around you that have line symmetry? List 3 of them below and describe their lines of reflection out loud to a partner (or to yourself if you are alone).