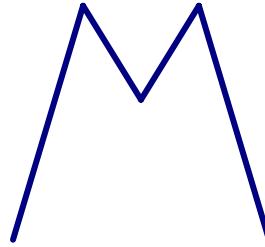
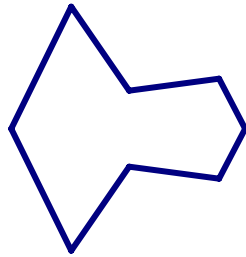
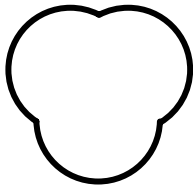


12.4 Symmetries

There are several types of symmetries.

First Line Symmetry: A figure has a line of symmetry if it is its own image under a reflection in that line.

Can you see lines of symmetry for each of these figures? Do any of them have more than one line of symmetry?



What about a circle? Does it have any lines of symmetry?

If so, how many?



Count the lines of symmetry of these figures:



Star

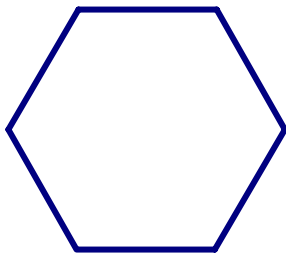
Club

Infinity

Rhombus

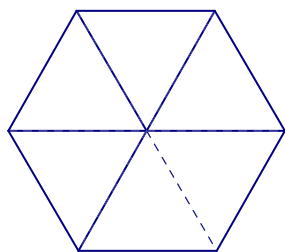
Square

What about a regular hexagon? How many lines of symmetry can you find?



Second Rotational Symmetry: A figure has rotational (or turn) symmetry when the traced figure can be rotated less than 360° about some point so that it matches the original figure. The point about which the figure turns is called the center or turn center. (Any figure rotated 360° will coincide with itself.)

A regular hexagon has rotational symmetry. What would be the amount of the turn necessary to rotate this hexagon about its center until it is its own image?_____



Would any other amounts work?

In general, whenever a figure has α° turn symmetry, it will also coincide with itself when rotated $n\alpha^\circ$ for any non-zero integer n. Usually, the measurement α is given.

Let's look at some other figures that have rotational symmetry and determine the angles of rotation. These are from figure 12-47, page 870.

Then look at the figures in example 12-14 on page 871.

Third: Point Symmetry: A figure that has 180° rotational symmetry is said to have point symmetry about the turn center.

Consider the letter Z, for example. It has 180° rotational symmetry. Therefore, it has point symmetry.

Look at figure 12-50 on page 871 for some other figures with point symmetry.

Would the star from before have point symmetry?



Geometric figures can be classified by the number of symmetries they have. For example, if we knew that a certain triangle had one line of symmetry and no turn symmetries, can we identify the type of triangle that it must be?

Solve these "What am I" mysteries:

WHAT AM I?

WHAT AM I?

Clues: I am a quadrilateral.

Clues: I am a quadrilateral.

I have 4 lines of symmetry.
I have 3 turn symmetries.

Answer:_____

I have 2 lines of symmetry.
I have only 1 turn symmetry.

Answer:_____