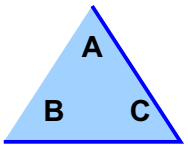
SYMMETRIES: A **symmetry** is a rigid transformation of a figure **onto itself**.

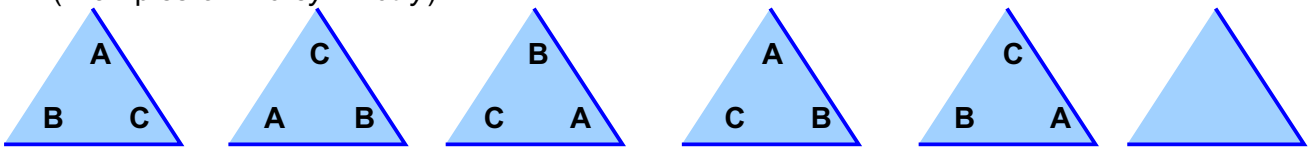
For example, an equilateral triangle ABC may be:
- rotated 120° (so that A→B, B→C and C→A) [[(A,B,C)]]
- rotated 240° (A→C, B→A and C→B). [[(A,C,B)]]

(Examples of *point symmetry* or *rotational symmetry*)



The triangle may also be:
- reflected through the altitude from A ... A stays put, B→C, C→B ... (A) (BC)
- reflected through the altitude from B [[(B) (A,C)]]
- reflected through the altitude from C. [[(C) (A,B)]]

(Examples of *line symmetry*)



I	σ_1	σ_2	ρ_1	ρ_2	ρ_3
Rotate 360° *(identity)*	*Rotate 120°*	*Rotate 240°*	*Flip over altitude A*	*Flip over altitude B*	*Flip over altitude C*
(A)(B)(C)	(ABC)	(ACB)	(A) (BC)	(B)(AC)	( )( )

Together with the 360° rotational symmetry (which is tantamount to leaving the figure alone!), which every figure has, these symmetries form "the symmetry group of an equilateral triangle".

1. The letter A has *line* symmetry. Draw the line of reflection, or line of symmetry.

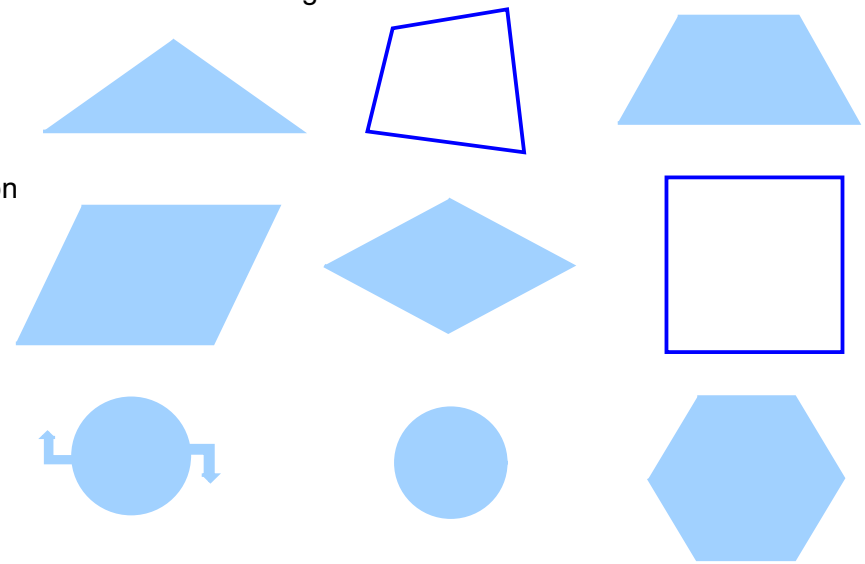
2. The letter B also has *line* symmetry. Check out these: C D E F Z

3. Do any of these letters have *rotational* symmetry?

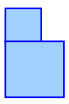
A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

4. Find all the symmetries of each of the following:

a. isosceles triangle region
b. scalene quadrilateral
c. isosceles trapezoid region
d. parallelogram region
e. rhombus region
f. square
g. regular hexagon region
h. circular region
i. the figure at right ➚



5. Name a figure that has TRANSLATIONAL SYMMETRY!



6. Add one square to this figure so that it will have one line & no rotational symmetry.
Add one square to this figure so that it will have one rotational & no line symmetry.