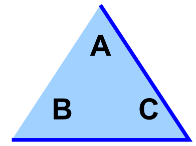
SYMMETRIES: A **symmetry** is a rigid transformation of a figure **onto itself**.

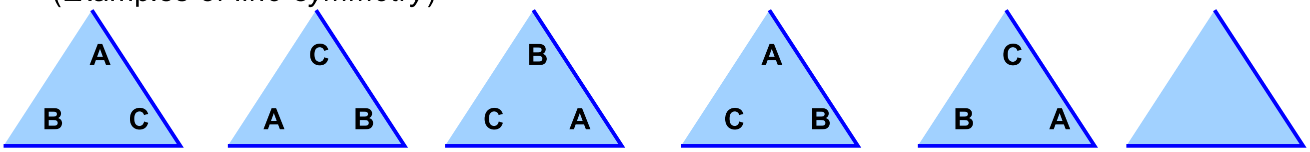
For example, an equilateral triangle ABC may be:

· 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°	*Rotate 120°*	*Rotate 240°*	*Flip over*	*Flip over*	*Flip over*
(identity)			*altitude A*	*altitude B*	*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

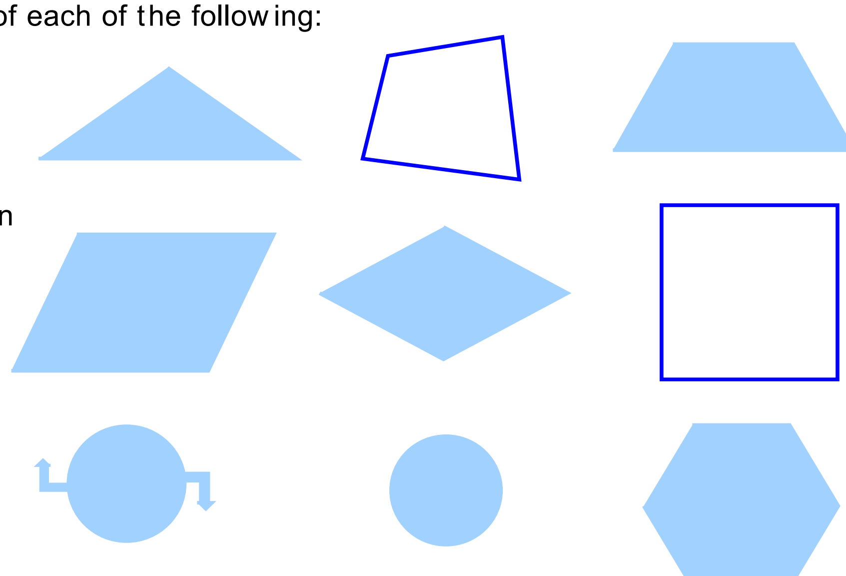
3. Do any of these letters have *rotational* symmetry?

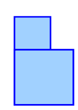
A B C D E F G H I J K L M

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

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