Transformations – Symmetry
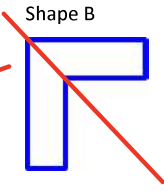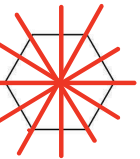
1. Draw in the lines of symmetry for each of the shapes. If none, leave the diagram blank. Then determine the order and angle of rotation for each shape.

Shape A   Shape B   Shape C   Shape D

Angle = 72 °   Angle = 360 °   Angle = 360 °   Angle = 60°

Order = 5   Order = 1   Order = 1   Order = 6

2. Which of the shapes above have point symmetry?

   Shape D

3. What do you notice about the above shapes' orders?

   Shape D has even order

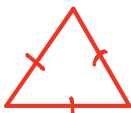Draw a figure that meets the symmetry requirements
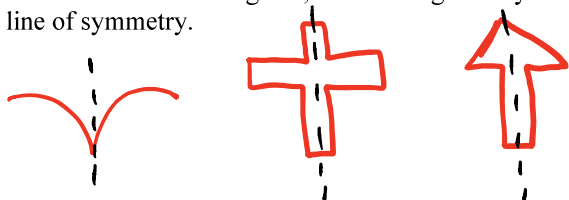4. line symmetry, but not rotational symmetry.

5. rotational symmetry, but not line symmetry.

   S

6. exactly 3 lines of symmetry.

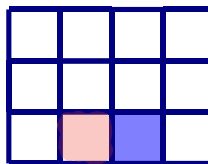7. Draw three different figures, each having exactly one line of symmetry.

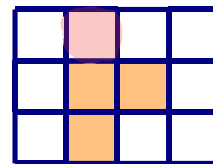8. What do you notice about the similarities of the three shapes you drew in 7?

   If you draw half the shape, you can reflect over line to get rest of shape

9. Shade each figure so it has the indicated number of reflectional symmetries.
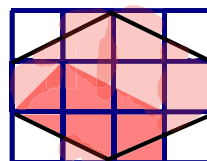
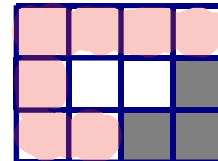Exactly 1 Line of Symmetry   Exactly 1 line of symmetry
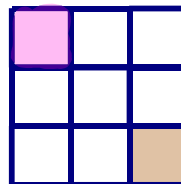
Exactly 2 lines of symmetry   Exactly 2 lines of symmetry
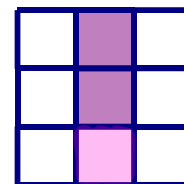
10. Shade each figure so it has rotational symmetry.
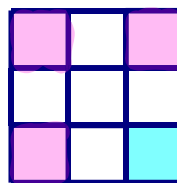
Order 2   Order 2
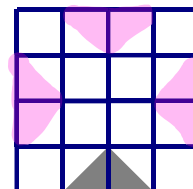
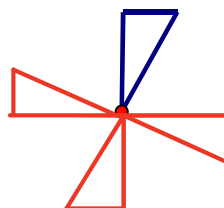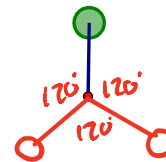Order 4   Order 4

11. Each figure shows part of a shape with a center of rotation and a given rotational symmetry. Complete the figure.
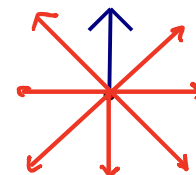
   Order 4   Order 3   Order 8

12. What is the relationship between the order of the shape and the angle of rotation?

   $$(order)(angle) = 360°$$
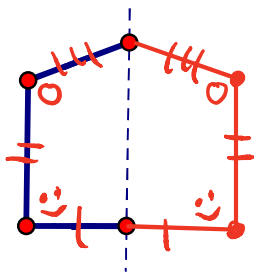
13. Provided is half of a shape and the line of reflection. Complete drawing the shape. Using dashes marks to show equal sides – label each of the sides to show who is equal to who in the shape. Do the same for angles, label which angles are equal to each other in the shape using matching symbols.


What do you notice about a shape that has one line of symmetry? *Reflection, Half the shape is on one side of Line of Symmetry.*

14. Given a regular hexagon, how can you alter it so that instead of having six lines of reflection it only has two? Draw the altered hexagon and draw in the two lines of symmetry.
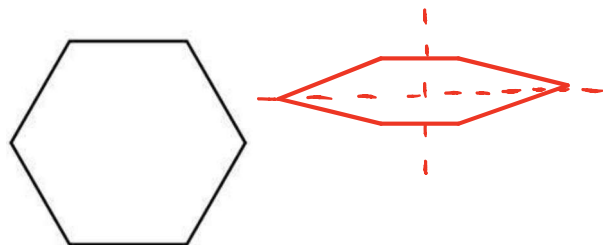
Determine the reflectional and rotational symmetries of triangles.
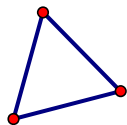
15. Scalene Triangle — How many lines of symmetry? *ZERO*

What is the order of rotational symmetry? *1*
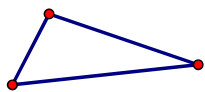
16. Isosceles Triangle — How many lines of symmetry? *1*

What is the order of rotational symmetry? *1*

17. Equilateral Triangle — How many lines of symmetry? *3*
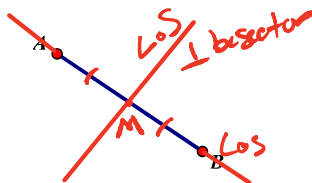
What is the order of rotational symmetry? *3*

18. Could a triangle have exactly 2 lines of symmetry? Explain.

NO — Line of Symmetry m makes $\overline{AB} \cong \overline{BC}$ and line n makes $\overline{BC} \cong \overline{AC}$. By transitive property of congruence of segments, $\overline{AB} \cong \overline{AC}$. ∴ ABC is Equilateral and has 3 L.S.

19. Given $\overline{AB}$, determine the following.

a) Does it have point symmetry? *Yes, the midpoint is PoS*

b) How many lines of symmetry does it have? *2*
Hint: it is not 1 line of symmetry

c) Draw in the line(s) of symmetry.

d) What is the unique name for the one of the lines of symmetry? *⊥ bisector*

e) What is rotational symmetry order? *2*

20. A triangle either has zero, one or three lines of symmetry. What is the possible number of lines symmetries for a hexagon? Draw in the ones that you found.

0 lines   1 line   2 lines

3 lines   4 lines   5 lines   6 lines

Not Possible   Not Possible

21. Determine the number of lines of symmetry for these REGULAR polygons and the rotational order.

LoS = *3*   LoS = *4*   LoS = *5*   Los = *6* .

Order = *120*   Order = *90*   Order = *72*   Order = *60*