

Symmetry

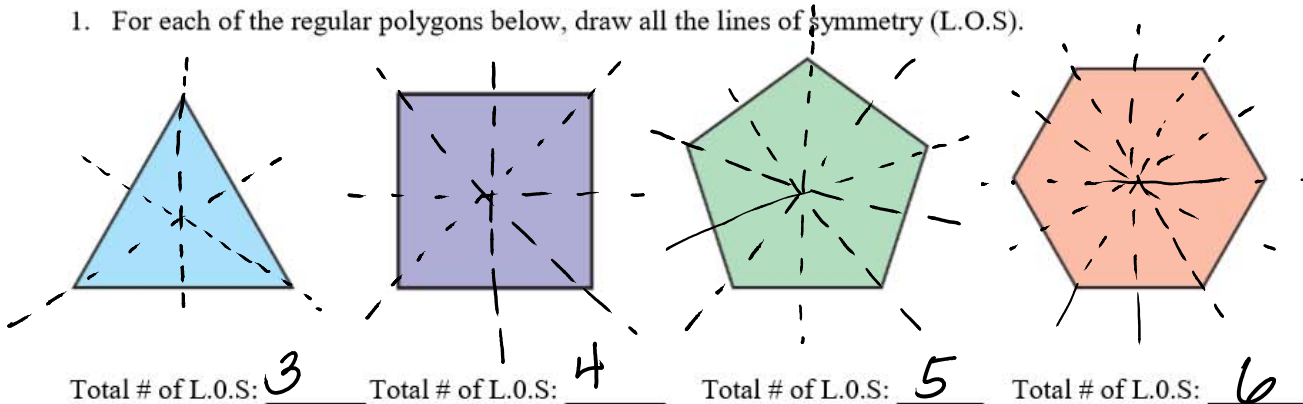
Wednesday, November 30, 2016 1:46 PM

A series of horizontal blue lines for writing, with a vertical red margin line on the left side.

Geo H
Symmetry

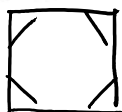
A figure has line symmetry (or reflection symmetry) if it can be reflected across a line so that the image coincides with the preimage. The line of symmetry, also called the axis of symmetry, divides the figure into two congruent halves.

1. For each of the regular polygons below, draw all the lines of symmetry (L.O.S).

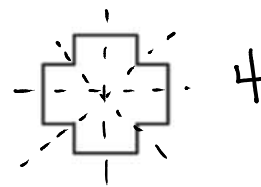
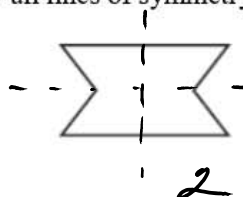
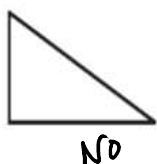


2. Look for a pattern. How many lines of symmetry does a regular n-gon have? n

3. Sketch a regular polygon that has exactly eight lines of symmetry. Mark the diagram to prove that the figure has eight lines of symmetry.



4. Tell whether the figure has line symmetry. If so, draw all lines of symmetry.



5. Sketch an isosceles triangle. How many lines of symmetry does it have? Explain.



only 1, and we can call it the median and altitude!

6. Sketch a scalene triangle. How many lines of symmetry does it have? Explain.



None! There is NO way to fold a scalene triangle in half and coincide.

7. Discuss whether or not it is possible for a regular polygon to have exactly two lines of symmetry. Explain. Draw picture if necessary.

NO. It would mean there are 2 sides and that is against the definition of a polygon.

8. Anna, Bob, and Otto write their names in capital letters. Draw all lines of symmetry for each whole name if possible.

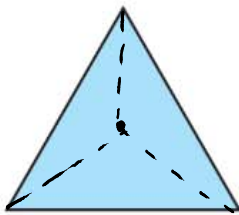
ANNA - BOB - OTTO

NO!

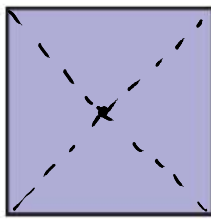
Rotational Symmetry

A figure has rotational symmetry (or radial symmetry) if it can be rotated about a point by an angle greater than 0° and less than 360° so that the image coincides with the preimage.

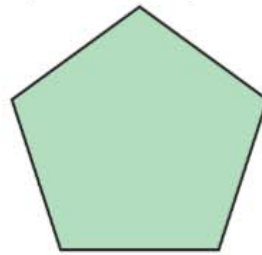
9. For each regular polygon, determine the order (the number of turns it takes for a figure to look exactly like itself). How many degrees of rotational symmetry does each figure have?



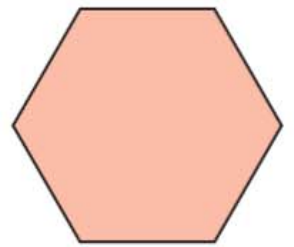
order: 3
degree: 120°



order: 4
degree: 90°



order: 5
degree: 72°



order: 6
degree: 60°

10. Look for a pattern. How many degrees of rotational symmetry does a regular n-gon have?

$\frac{360^\circ}{n}$ where n is the number of sides.

11. Discuss whether it is possible for a regular polygon to have 180° of rotational symmetry. Explain your reasoning here. Draw picture if necessary.

NO! It would mean there are only 2 sides and that's not a polygon.

12. Tell whether each figure has rotational symmetry. If so, give the angle of rotational symmetry and the order of the symmetry.



NO



degree: 180°
order: 2



degree: 90°
order: 4



degree: 120°
order: 3

13. Draw an irregular figure that has 180° of rotational symmetry.

