

Geometry - Symmetry of Polygons and Rigid Motions - Worksheet

Common Core G-CO.A.3, G-CO.B.6 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice line symmetry, rotational symmetry and rigid motions of polygons (Common Core G-CO.A.3, G-CO.B.6). The first problems are quick one-step checks of the definitions and formulas from the lesson. The middle problems ask for diagrams, equations and careful reasoning in the style of a high school Geometry class. The last six problems are applications with signs, wheels, tiles and coordinates.

Geometry · Common Core State Standards: **G-CO.A.3, G-CO.B.6**

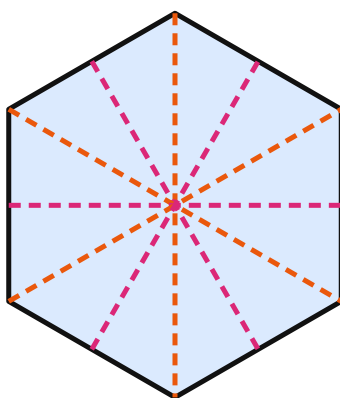
Exercise 1 - Square lines

How many lines of symmetry does a square have?

Exercise 2 - Table top

A table top is a rectangle 90 cm by 60 cm. How many lines of symmetry does the table top have, and where do they lie?

Exercise 3 - Regular hexagon



Regular hexagon.

How many lines of symmetry does a regular hexagon have, and what is its smallest angle of rotation?

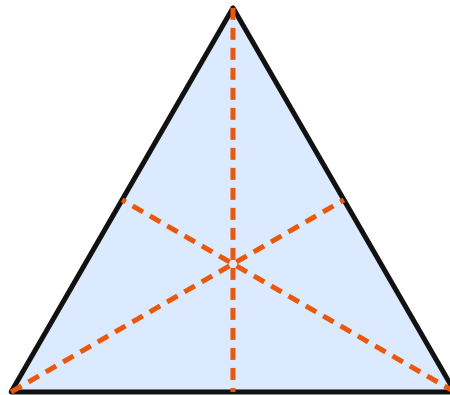
Exercise 4 - Pentagon rotation

Find the smallest positive rotation that maps a regular pentagon onto itself.

Exercise 5 - Octagon rotation

A stop sign is a regular octagon. Find its number of lines of symmetry and its smallest rotation angle.

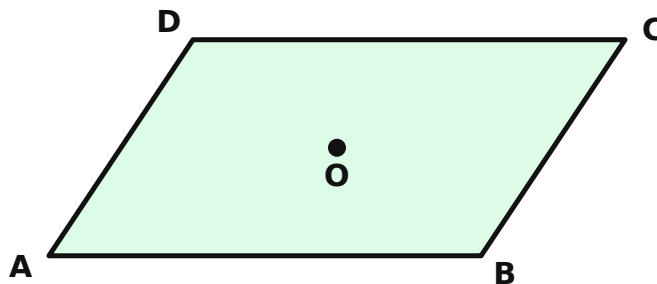
Exercise 6 - Equilateral triangle



Equilateral triangle.

List the lines of symmetry of an equilateral triangle and the rotations (less than 360°) that map it onto itself.

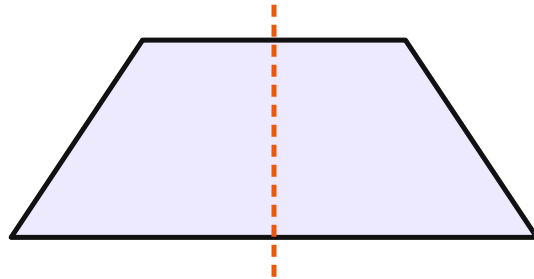
Exercise 7 - Parallelogram



A parallelogram with center O.

Parallelogram ABCD has no right angles and unequal adjacent sides. Does it have line symmetry? Does it have rotational symmetry? Describe.

Exercise 8 - Isosceles trapezoid



Isosceles trapezoid.

How many lines of symmetry does an isosceles trapezoid have? Does it have rotational symmetry?

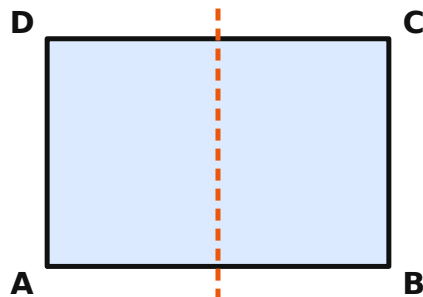
Exercise 9 - Rhombus

A rhombus is not a square. State its number of lines of symmetry and its smallest rotation.

Exercise 10 - Twelve-sided polygon

List every rotation less than 360° that maps a regular 12-gon onto itself. How many rotations are there, counting 360° ?

Exercise 11 - Reflect a rectangle



Rectangle with the line $x = 3$.

Rectangle ABCD has A(0, 0), B(6, 0), C(6, 4) and D(0, 4). Reflect it across the line $x = 3$. Where does each vertex go? Is this a symmetry?

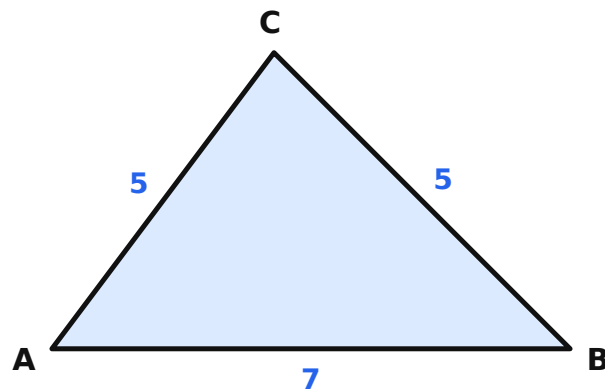
Exercise 12 - Rotate a rectangle

The center of the same rectangle is (3, 2). A 180° rotation about the center has rule $(x, y) \rightarrow (6 - x, 4 - y)$. Find the image of each vertex.

Exercise 13 - Find n from the angle

A regular polygon maps onto itself under a rotation of 40° but not under any smaller positive rotation. Find the number of sides.

Exercise 14 - Distances are preserved



Triangle ABC.

Triangle ABC has $AB = 7$, $BC = 5$ and $CA = 5$. It is reflected and then rotated to give triangle $A'B'C'$. Find the perimeter of $A'B'C'$ and the measure of an angle in $A'B'C'$ that corresponds to a 53° angle in ABC.

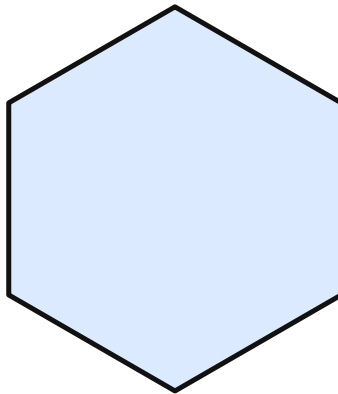
Exercise 15 - Square symmetries

A square has vertices $(2,2), (-2,2), (-2,-2), (2,-2)$. List all rotations about the origin (less than 360°) and all reflections that map it onto itself. How many symmetries are there including the identity?

Exercise 16 - Capital letters

Which of the letters A, B, F, H, M, R, T have a vertical line of symmetry?

Exercise 17 - Pinwheel



Pinwheel with 6 blades.

A pinwheel at a school fair has 6 identical blades evenly spaced. Jamal spins it by 150° . Does the pinwheel look the same? Which rotation angles below 180° give an identical look?

Exercise 18 - Wheel spokes

A bike wheel has 10 evenly spaced spokes. Find the smallest rotation that maps the spokes onto themselves and list the rotations below 180° .

Exercise 19 - Road signs

A yield sign is an equilateral triangle and a stop sign is a regular octagon. Which has more lines of symmetry, and how many more? Which has the larger smallest rotation, and by how much?

Exercise 20 - Rhombus tile

A rhombus tile has diagonals of 10 inches and 24 inches. A reflection across the longer diagonal is a symmetry of the tile. Find the side length and the perimeter.