

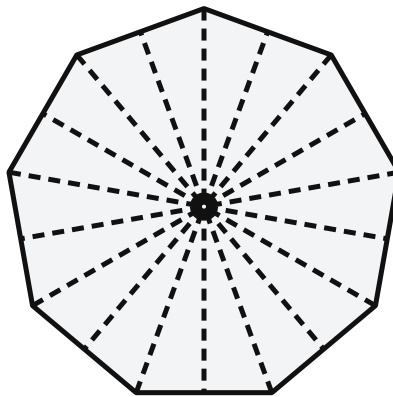
Geometry - Symmetry of Polygons and Rigid Motions - Test Answer Key

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

Use this answer key and scoring guide for the symmetry test. Each solution shows the full work, and the scoring note tells how the points are split between method and final answer. Partial credit is listed so that grading stays consistent from one paper to the next.

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

Question 1 - Nonagon symmetry [2 pts]



Regular nonagon with its 9 lines of symmetry.

9 lines of symmetry.

$$360^\circ \div 9 = 40^\circ$$

9 lines; 40°

Scoring: 1 point for each correct value.

Question 2 - Rectangle symmetries [2 pts]

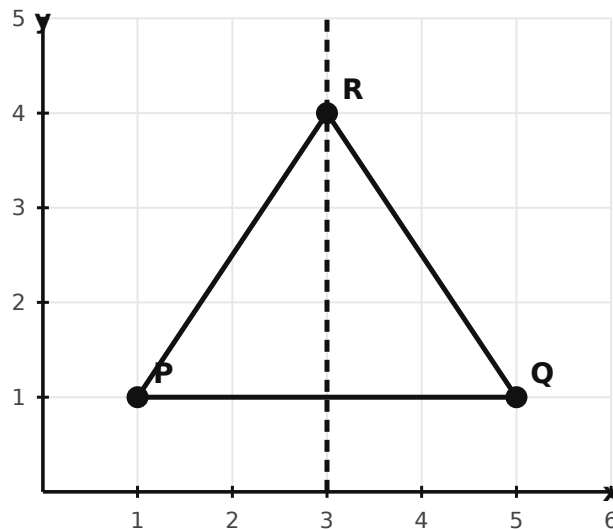
Rotation of 180° about the center.

Reflection across the vertical line through the midpoints of AB and CD.

Reflection across the horizontal line through the midpoints of BC and DA.

Scoring: 1 point for the rotation, 1 point for both reflections.

Question 3 - Isosceles triangle [3 pts]



Dashed line $x = 3$.

- a. $PR = \sqrt{2^2 + 3^2} = \sqrt{13}$ and $QR = \sqrt{(-2)^2 + 3^2} = \sqrt{13}$
b. The reflection across $x = 3$ is (x, y) maps to $(6 - x, y)$. $P(1, 1)$ maps to $(5, 1) = Q$,
 Q maps to P , $R(3, 4)$ maps to $(3, 4) = R$. Vertices map to vertices.

(a) $PR = QR = \sqrt{13}$; (b) $P \leftrightarrow Q$ and R stays fixed

Scoring: (a) 1 point. (b) 1 point for the rule, 1 point for the three images.

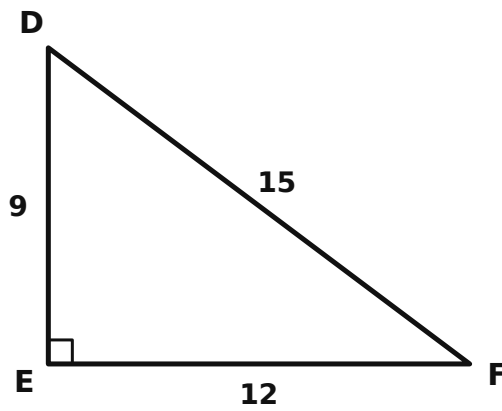
Question 4 - Rotation without reflection [2 pts]

A 180° rotation about O, the intersection of the diagonals, sends A to C and B to D.

A reflection across a diagonal would send a vertex to a point that is not a vertex, because the diagonals are not perpendicular bisectors of the sides.

Scoring: 1 point for the rotation, 1 point for the explanation.

Question 5 - Preserved measures [2 pts]



Triangle DEF.

$DE = 9$, $EF = 12$ and $m\angle E = 90^\circ$ because rotations preserve distance and angle measure.

$$DF = \sqrt{9^2 + 12^2} = 15.$$

$DE = 9$, $EF = 12$, $m\angle E = 90^\circ$, $DF = 15$

Scoring: 1 point for the preserved values, 1 point for DF.

Question 6 - 15-gon [3 pts]

15 lines of symmetry.

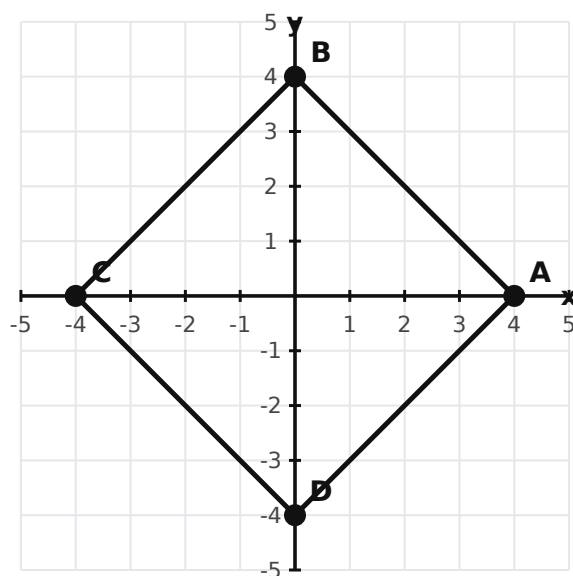
$$360^\circ \div 15 = 24^\circ$$

The rotations are multiples of 24° up to 360° , so there are 15.

15 lines; 24° ; 15 rotations

Scoring: 1 point for each correct value.

Question 7 - Square vertices [2 pts]



A maps to B, B to C, C to D, D to A.

$(4,0)$ maps to $(0,4)$, $(0,4)$ maps to $(-4,0)$, $(-4,0)$ maps to $(0,-4)$, $(0,-4)$ maps to $(4,0)$.

Every vertex maps to a vertex, so this 90° rotation is a symmetry.

Scoring: 1 point for the images, 1 point for the conclusion.

Question 8 - Letters [2 pts]

H, N, S and Z all look the same after a 180° turn.

Only H has a horizontal line of symmetry (and a vertical one).

180° rotation: H, N, S, Z; horizontal line: H

Scoring: 1 point for each part.

Question 9 - Fan blades [2 pts]

$$360^\circ \div 5 = 72^\circ.$$

Rotations: 72° , 144° , 216° and 288° .

72° apart; 72° , 144° , 216° , 288°

Scoring: 1 point for the angle, 1 point for the list.

Total
20 points