

Geometry - Translations, Reflections and Rotations - Worksheet

Common Core G-CO.A.2, G-CO.A.4, G-CO.A.5 · maths-pdf.fr/en/

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

These 20 problems practice translations, reflections, rotations and sequences of rigid motions on the coordinate plane (Common Core G-CO.A.2 to G-CO.A.5). 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 applied problems with games, cranes, tiles and compositions.

Geometry · Common Core State Standards: **G-CO.A.2, G-CO.A.4, G-CO.A.5**

Exercise 1 - Translate a point

Translate $(3, -2)$ by the rule (x, y) maps to $(x+4, y+5)$.

Exercise 2 - Reflect across the x-axis

Reflect $(5, -3)$ across the x-axis.

Exercise 3 - Reflect across the y-axis

Reflect $(-4, 6)$ across the y-axis.

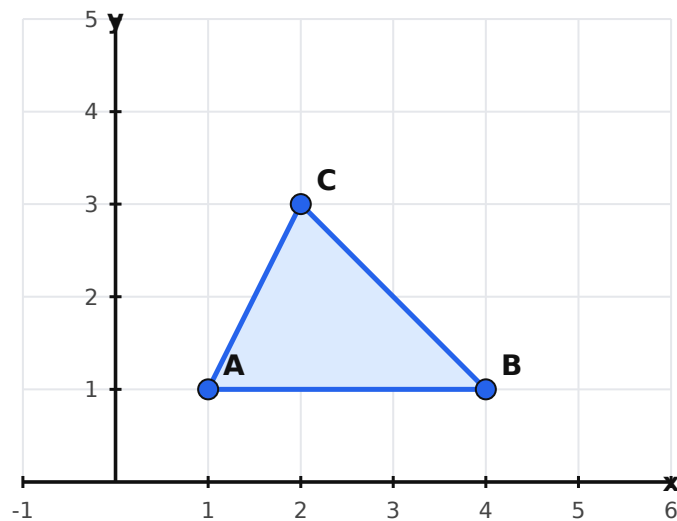
Exercise 4 - Rotate 90 degrees

Rotate $(2, 5)$ by 90° counterclockwise about the origin.

Exercise 5 - Rotate 180 degrees

Rotate $(-3, 4)$ by 180° about the origin.

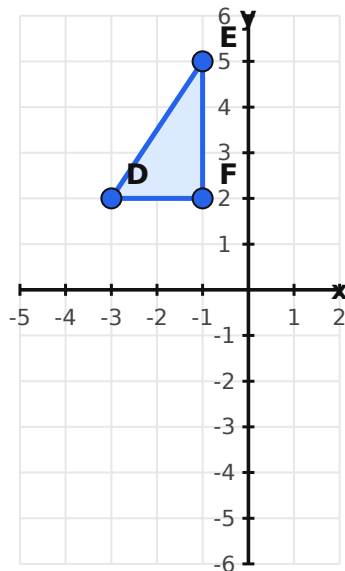
Exercise 6 - Translate a triangle



Triangle ABC.

Triangle ABC has vertices $A(1,1)$, $B(4,1)$ and $C(2,3)$. Translate it by (x,y) maps to $(x-5,y+2)$ and list the vertices of the image.

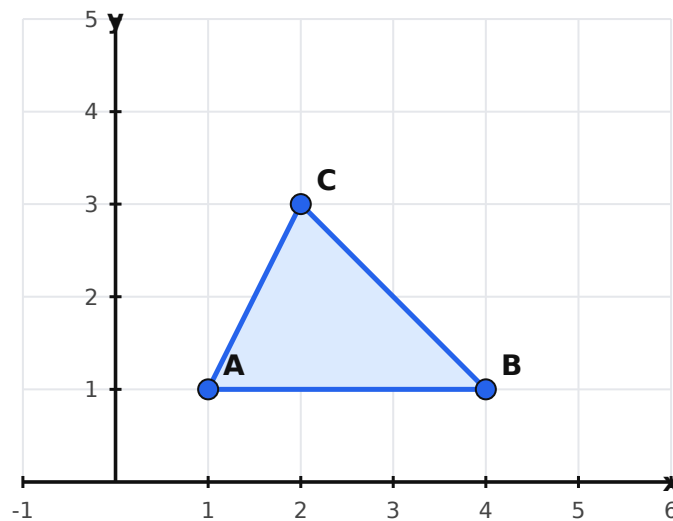
Exercise 7 - Reflect a triangle



Triangle DEF.

Reflect triangle DEF, with $D(-3,2)$, $E(-1,5)$ and $F(-1,2)$, across the x-axis. Give the image vertices.

Exercise 8 - Rotate a triangle clockwise



Triangle ABC.

Rotate triangle ABC with $A(1,1)$, $B(4,1)$ and $C(2,3)$ by 90° clockwise about the origin. Give the image vertices.

Exercise 9 - Reflect across $y = x$

Reflect $(3,-7)$ across the line $y = x$.

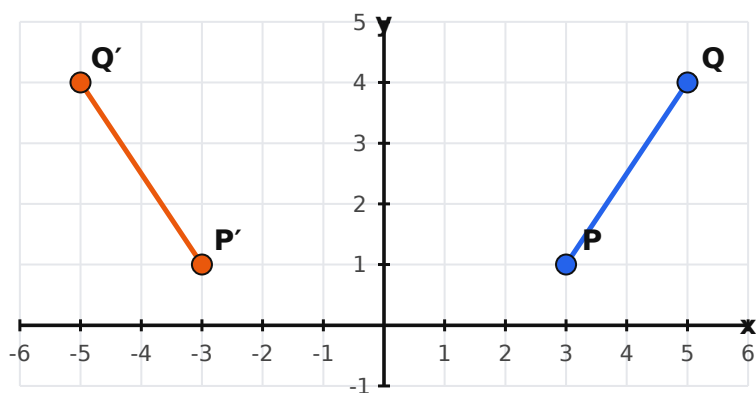
Exercise 10 - Reflect across a vertical line

Reflect $(6,1)$ across the line $x = 2$.

Exercise 11 - Find the translation rule

A translation maps $A(2,3)$ to $A'(-1,7)$. Write the rule and find the image of $B(0,-5)$.

Exercise 12 - Identify the transformation



Segment PQ and its image.

Segment PQ with $P(3, 1)$ and $Q(5, 4)$ maps to segment $P'Q'$ with $P'(-3, 1)$ and $Q'(-5, 4)$. Name the transformation.

Exercise 13 - Rotate 270 degrees

Rotate $(4, -1)$ by 270° counterclockwise about the origin.

Exercise 14 - Reflect, then translate

Reflect $(3, 4)$ across the x-axis, then translate the image by $(x+2, y-1)$.

Exercise 15 - Does the order matter?

Translate $(3, 4)$ by $(x+2, y-1)$ first and then reflect across the x-axis. Compare with the previous problem.

Exercise 16 - Video game sprite

In a video game, a sprite starts at $(6, 2)$ on the screen grid. It moves 4 units left and 3 units up, and then a mirror effect reflects it across the y-axis. Find its final position.

Exercise 17 - Crane arm



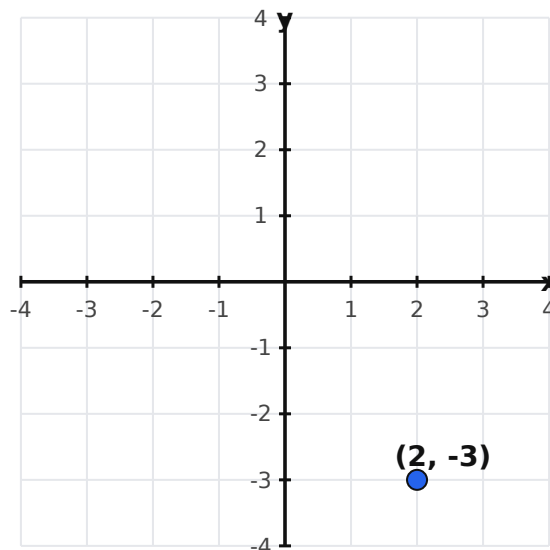
Crane arm at (8, 6).

The tip of a crane arm is at (8, 6) relative to the base at the origin. The arm swings 90° counterclockwise. Find the new tip location and show that the arm length did not change.

Exercise 18 - Floor tile

A parallelogram tile has vertices (1,2), (4,2), (5,4) and (2,4). Rotate the tile 180° about the origin and list the new vertices.

Exercise 19 - Two-step sequence



Starting point.

A point (2, -3) is reflected across the y-axis and then rotated 90° counterclockwise about the

origin. Find the final point.

Exercise 20 - Rigid motions keep distance

Segment AB has endpoints $A(1,2)$ and $B(4,6)$. Rotate it 90° counterclockwise about the origin and show that the length stays the same.