LESSON MAKER PRO

Point Path Puzzles

Track points through transformations in order.

HIGH SCHOOL · GDA.GM.D.21.a

GDA.GM.D.21.a "Describe transformations and compositions of transformations as functions that take points in the plane as inputs and give other points as outputs, using informal and formal notation."

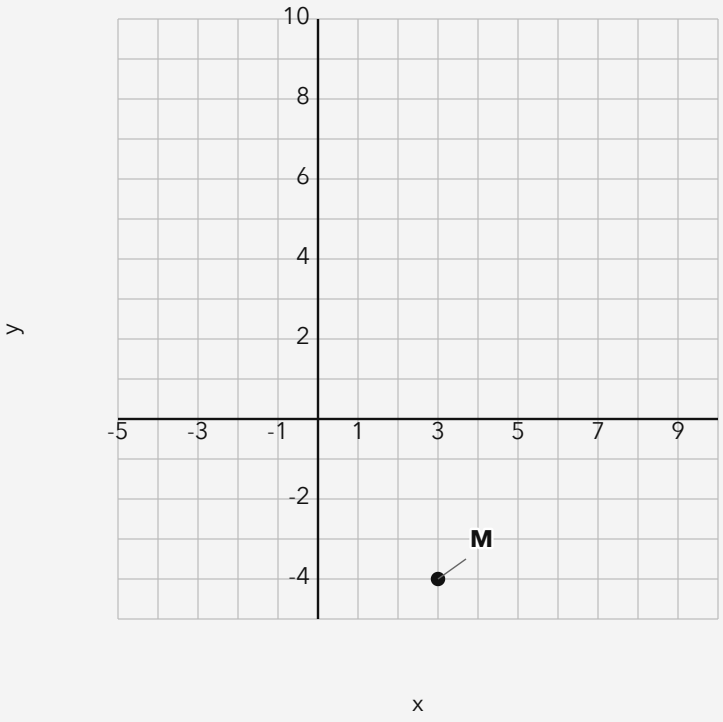
NAME _____ DATE _____

FOLLOW THE FUNCTION PATH

A transformation is a function that takes a point as an input and gives another point as an output. In G(F(P)), apply F to P first, then apply G to the result. Changing the order can change the final point.

WORKED EXAMPLE

Use point M on the grid. Reflect it across the x-axis with F, then translate it 6 units right and 5 units up with T. Find T(F(M)).

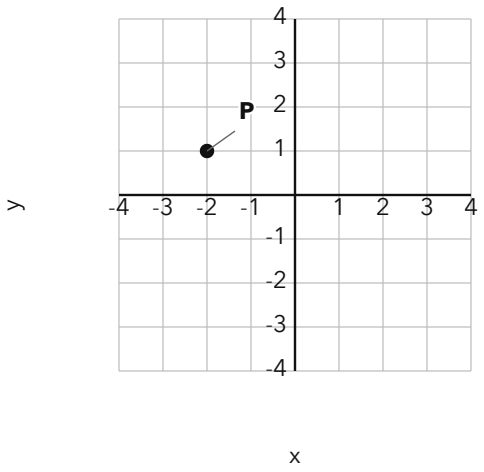


1. Read M from the grid: M = (3, -4).
2. Reflect across the x-axis: F(M) = (3, 4).
3. Translate the result: T(3, 4) = (3 + 6, 4 + 5) = (9, 9).

Answer: T(F(M)) = (9, 9)

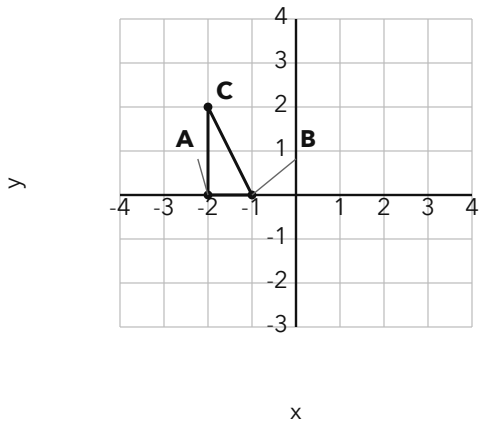
PRACTICE 6 problems

1 Reflect P across the y-axis with F. Then translate 1 unit left and 2 units up with T. Give F(P) and T(F(P)).



ANSWER _____

2 Translate the triangle 2 units right and 1 unit down with T. Then reflect it across the y-axis with R. Write a rule for R(T(x, y)), and give the final coordinates of A, B, and C.



ANSWER _____

3 Let F(x, y) = (x, -y) and T(x, y) = (x - 2, y + 1). Find T(F(-1, -2)).

ANSWER _____

4 Let R reflect a point across the y-axis, and let T move it 2 units right. For Q = (1, 1), find T(R(Q)) and R(T(Q)).

ANSWER _____

5 Let H(x, y) = (-x, -y) and T(x, y) = (x - 2, y + 1). Write one rule for T(H(x, y)).

ANSWER _____

6 A point P is reflected across the x-axis with F. Then T(x, y) = (x + 2, y - 1) moves it to (0, 2). Find the original point P.

ANSWER _____

APPLY IT Show your work

1 You are placing a sticker in a game design. Its position is P = (-1, 2). An effect reflects it across the y-axis with R, then moves it 2 units right and 1 unit down with T. Write the composition and find the sticker's final position.

WORK SPACE

ANSWER _____

2 A skate video editor places a graphic at P = (2, -1). The editor rotates it 90° clockwise about the origin with R, then moves it 1 unit left and 2 units up with T. Write the composition and find the graphic's final position.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A point P = (x, y) is reflected across the y-axis with R, translated 2 units left and 1 unit up with T, then rotated 90° counterclockwise about the origin with C. Write one rule for C(T(R(x, y))). If the final point is (0, -1), find P and explain how you know.

WORK SPACE AND ANSWER

ANSWER KEY

Point Path Puzzles

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Reflect P across the y-axis with F. Then translate 1 unit left and 2 units up with T. Give F(P) and T(F(P)).	**F(P) = (2, 1); T(F(P)) = (1, 3)**
2	Translate the triangle 2 units right and 1 unit down with T. Then reflect it across the y-axis with R. Write a rule for R(T(x, y)), and give the final coordinates of A, B, and C.	**R(T(x, y)) = (-x - 2, y - 1); A' = (0, -1), B' = (-1, -1), C' = (0, 1)**
3	Let F(x, y) = (x, -y) and T(x, y) = (x - 2, y + 1). Find T(F(-1, -2)).	**(-3, 3)**
4	Let R reflect a point across the y-axis, and let T move it 2 units right. For Q = (1, 1), find T(R(Q)) and R(T(Q)).	**T(R(Q)) = (1, 1); R(T(Q)) = (-3, 1)**
5	Let H(x, y) = (-x, -y) and T(x, y) = (x - 2, y + 1). Write one rule for T(H(x, y)).	**T(H(x, y)) = (-x - 2, -y + 1)**
6	A point P is reflected across the x-axis with F. Then T(x, y) = (x + 2, y - 1) moves it to (0, 2). Find the original point P.	**P = (-2, -3)**

PART 2 · APPLY IT

1. **T(R(P)) = (3, 1)** Reflection sends (-1, 2) to (1, 2). The translation sends (1, 2) to (3, 1).
2. **T(R(P)) = (-2, 0)** The clockwise rotation sends (2, -1) to (-1, -2). The translation sends (-1, -2) to (-2, 0).

CHALLENGE

C(T(R(x, y))) = (-y - 1, -x - 2). Since -y - 1 = 0 and -x - 2 = -1, y = -1 and x = -1. Thus P = (-1, -1).

Accept equivalent notation that clearly preserves the order of transformations. In problem 2, the final vertices must match their original labels.