LESSON MAKER PRO

Coordinate Moves

Name the move, then write the rule.

HIGH SCHOOL · MA.912.GR.2.1

MA.912.GR.2.1 "Given a preimage and image, describe the transformation and represent the transformation algebraically using coordinates."

NAME ______________________ DATE ______________

TRACK BOTH COORDINATES

Match each preimage coordinate to its image coordinate. A translation has the rule (x,y)->(x+a,y+b), where a is the horizontal change and b is the vertical change. For reflections and rotations, look for swapped coordinates or changes in signs, then state the coordinate rule.

WORKED EXAMPLE

Point D(-14,15) maps to D'(-3,22). Describe the transformation and write its coordinate rule.

1. Compare x-coordinates: -3 - (-14) = 11.
2. Compare y-coordinates: 22 - 15 = 7.
3. Add 11 to x and 7 to y.

Answer: Translation right 11 and up 7; (x,y)->(x+11,y+7).

PRACTICE

6 problems

1 P(-2,5) maps to P'(4,1), and Q(0,-1) maps to Q'(6,-5). Describe the transformation and write its coordinate rule.

ANSWER ______________

2 Q(5,-2) maps to Q'(2,5), and R(1,4) maps to R'(-4,1). Describe the transformation and write its coordinate rule.

ANSWER ______________

3 R(-4,1) maps to R'(4,1), and S(-1,-5) maps to S'(1,-5). Describe the transformation and write its coordinate rule.

ANSWER ______________

4 T(2,-5) maps to T'(2,5), and U(-4,1) maps to U'(-4,-1). Describe the transformation and write its coordinate rule.

ANSWER ______________

5 V(-1,4) maps to V'(1,-4), and W(5,-2) maps to W'(-5,2). Describe the transformation and write its coordinate rule.

ANSWER ______________

6 X(-5,2) maps to X'(2,-5), and Y(1,4) maps to Y'(4,1). Describe the transformation and write its coordinate rule.

ANSWER ______________

APPLY IT Show your work

1 A game designer places a triangular badge with vertices H(-6,2), J(-1,5), and K(-4,-2) on the left side of a game screen. The matching badge has vertices H'(6,2), J'(1,5), and K'(4,-2). Describe the transformation and write its coordinate rule.

WORK SPACE

ANSWER ______________________

2 For a short video intro, a student rotates a logo. The original vertices are M(-4,6), N(1,2), and O(-5,-2). The new vertices are M'(6,4), N'(2,-1), and O'(-2,5). Describe the transformation and write its coordinate rule.

WORK SPACE

ANSWER ______________________

CHALLENGE One step up

CHALLENGE

A graphic starts with A(0,0), B(2,0), and C(0,5). Its final image is A'(4,-2), B'(4,0), and C'(-1,-2). The graphic was rotated about the origin and then translated. Determine both transformations, write one combined coordinate rule, and explain how the point pairs support your answer.

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ANSWER KEY **Coordinate Moves** HIGH SCHOOL · MA.912.GR.2.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	P(-2,5) maps to P'(4,1), and Q(0,-1) maps to Q'(6,-5). Describe the transformation and write its coordinate rule.	**Translation right 6 and down 4; (x,y)->(x+6,y-4).**
2	Q(5,-2) maps to Q'(2,5), and R(1,4) maps to R'(-4,1). Describe the transformation and write its coordinate rule.	**Rotation 90 degrees counterclockwise about the origin; (x,y)->(-y,x).**
3	R(-4,1) maps to R'(4,1), and S(-1,-5) maps to S'(1,-5). Describe the transformation and write its coordinate rule.	**Reflection across the y-axis; (x,y)->(-x,y).**
4	T(2,-5) maps to T'(2,5), and U(-4,1) maps to U'(-4,-1). Describe the transformation and write its coordinate rule.	**Reflection across the x-axis; (x,y)->(x,-y).**
5	V(-1,4) maps to V'(1,-4), and W(5,-2) maps to W'(-5,2). Describe the transformation and write its coordinate rule.	**Rotation 180 degrees about the origin; (x,y)->(-x,-y).**
6	X(-5,2) maps to X'(2,-5), and Y(1,4) maps to Y'(4,1). Describe the transformation and write its coordinate rule.	**Reflection across the line y=x; (x,y)->(y,x).**

PART 2 · APPLY IT

1. **Reflection across the y-axis; (x,y)->(-x,y).** Each x-coordinate changes to its opposite, while each y-coordinate stays the same. This is a reflection across the y-axis.
2. **Rotation 90 degrees clockwise about the origin; (x,y)->(y,-x).** Each image point uses the original y-coordinate as its x-coordinate and the opposite of the original x-coordinate as its y-coordinate. That rule represents a 90-degree clockwise rotation about the origin.

CHALLENGE

The vectors from A to B and A to C turn from right and up to up and left, so the figure rotates 90 degrees counterclockwise about the origin. Then it translates right 4 and down 2; the combined rule is (x,y)->(-y+4,x-2).

Accept equivalent wording for directions and equivalent coordinate-rule formatting. For the challenge, accept the transformations stated in the correct order or the correct combined rule with a valid explanation based on coordinate changes.