

Reflections Activity—Answer Key

Part I. Exploring Reflections

Reflect the figure across the line identified in each problem using your reflection tool. Record the coordinates of each new figure. Tip: It may be helpful to re-draw the line of reflection on the coordinate graph and label each new point in a different color. After you have completed your drawings, provide any observations you notice of your new drawing compared to the given figure on the lines below.

1.

ORIGINAL COORDINATES	LINE OF REFLECTION	NEW COORDINATES
A: (4, -3)	x- axis	A ^I : (4, 3)
	y- axis	A ^{II} : (-4,-3)
	y = x	A ^{III} : (-3,4)

Observations:

[Sample Student Responses: After reflecting across the x-axis, the x-coordinate stayed the same, but the y-coordinate is opposite. After reflecting across the y-axis, the y-coordinate stayed the same, but the x-coordinate is opposite. After reflecting across the line $y = x$, the x-coordinate and the y-coordinate switched.]

2.

ORIGINAL COORDINATES	LINE OF REFLECTION	NEW COORDINATES
B: (-4, 5)	x = 2	B ^I (8, 5)
	y = -1	B ^{II} (-4, -7)
	y = x	B ^{III} (5, -4)

Observations:

[Sample Student Responses: After reflecting across the line $x=2$, the x-coordinate moved 12 spaces to the right. After reflecting across the line $y=-1$, the y-coordinate moved down 12. After reflecting across the line $y = x$, the x-coordinate and the y-coordinate switched.]

3.

ORIGINAL COORDINATES	LINE OF REFLECTION	NEW COORDINATES
C: (-5, -1) D: (-2, -3)	x- axis	A: (-5, 1) B: (-2, 3)
	y = x	A: (-1, -5) B: (-3, -2)
	y = 1	A: (-5, 1) B: (-2, 5)

Observations:

[Sample Student Responses: After reflecting across the x-axis, the x-coordinates for points A & B stayed the same, but the y-coordinates are the opposite. After reflecting across the line $y=x$, the x and y-coordinates for points A and B switch. After reflecting across the line $y=1$, the x-coordinates for points A & B stay the same, while the y-coordinate for point A goes up by 2 and the y-coordinate for point B goes up by 8.]

4.

Original Coordinates	Line of Reflection	New Coordinates
E: (2, 5) F: (2, 1) G: (6, 1)	y- axis	E ^l : (-2, 5) F ^l : (-2, 1) G ^l : (-6, 1)
	x = -1	E ^l : (-4, 5) F ^l : (-4, 1) G ^l : (-8, 1)
	y = x	E ^l : (5, 2) F ^l : (1, 2) G ^l : (1, 6)

Observations:

[Sample Student Responses: After reflecting across the y-axis, the y-coordinates for points E, F, & G stayed the same, but the x-coordinates are all opposite. After reflecting across the line $x=-1$, the y-coordinates for points E, F, G stay the same, while the x-coordinate for points E & F each move six to the left and for point G moves 14 to the left.]

Part II. Exploring Properties of Reflections. Reflect the following figures across the line of reflection and label all new points as you did previously. Fill in the coordinates of the given figure next to the points and also provide the coordinates of the new figure. What relationships do you notice, if any, between the two sets of coordinates?

1. Reflect Line AB over four different lines of reflection of your choosing. State the line of reflection and new coordinates in the table below. Then make observations based on what you noticed during your reflections.

ORIGINAL COORDINATES	LINE OF REFLECTION	NEW COORDINATES
A: (-2, 1) B: (-5, 4)	Answers will vary.	$A^I: (\quad , \quad)$ $B^I: (\quad , \quad)$ Answers will vary.
		$A^{II}: (\quad , \quad)$ $B^{II}: (\quad , \quad)$ Answers will vary.
		$A^{III}: (\quad , \quad)$ $B^{III}: (\quad , \quad)$ Answers will vary
		$A^{IV}: (\quad , \quad)$ $B^{IV}: (\quad , \quad)$ Answers will vary.

Observations:

[Student answers will vary.]

2. Reflect Triangle CDE over four different lines of reflection of your choosing. State the line of reflection and new coordinates in the table below. Then make observations based on what you noticed during your reflections.

ORIGINAL COORDINATES	LINE OF REFLECTION	NEW COORDINATES
K: (-4, -1) L: (-4, -5) M: (0, -5)	Answers will vary.	$K^I: (\quad , \quad)$ $L^I: (\quad , \quad)$ $M^I: (\quad , \quad)$ Answers will vary.
		$K^{II}: (\quad , \quad)$ $L^{II}: (\quad , \quad)$ $M^{II}: (\quad , \quad)$ Answers will vary.
		$K^{III}: (\quad , \quad)$ $L^{III}: (\quad , \quad)$ $M^{III}: (\quad , \quad)$ Answers will vary.
		$K^{III}: (\quad , \quad)$ $L^{III}: (\quad , \quad)$ $M^{III}: (\quad , \quad)$ Answers will vary.

Observations:

[Student answers will vary.]

3. Reflect Triangle CDE over four different lines of reflection of your choosing. State the line of reflection and new coordinates in the table below. Then make observations based on what you noticed during your reflections. Choose at least one line of reflection that intersects the figure and choose at least one line of reflection that does not intersect the figure.

ORIGINAL COORDINATES	LINE OF REFLECTION	NEW COORDINATES
C: (2, 5) D: (2, -2) E: (5, -2)	Answers will vary.	$C^I: (\quad , \quad)$ $D^I: (\quad , \quad)$ $E^I: (\quad , \quad)$ Answers will vary.
		$C^{II}: (\quad , \quad)$ $D^{II}: (\quad , \quad)$ $E^{II}: (\quad , \quad)$ Answers will vary.
		$C^{III}: (\quad , \quad)$ $D^{III}: (\quad , \quad)$ $E^{III}: (\quad , \quad)$ Answers will vary.
		$C^{IV}: (\quad , \quad)$ $D^{IV}: (\quad , \quad)$ $E^{IV}: (\quad , \quad)$ Answers will vary.

Observations:

[Student answers will vary.]

4. Reflect Quadrilateral GHIJ over four different lines of reflection of your choosing. State the line of reflection and new coordinates in the table below. Then make observations based on what you noticed during your reflections. Choose at least one line of reflection that intersects the figure and choose at least one line of reflection that does not intersect the figure.

ORIGINAL COORDINATES	LINE OF REFLECTION	NEW COORDINATES
G: (-1, 4) H: (-1, -2) I: (4, -2) J: (4, 4)	Answers may vary.	$G^I: (\quad , \quad)$ $H^I: (\quad , \quad)$ $I^I: (\quad , \quad)$ $J^I: (\quad , \quad)$ Answers will vary.
		$G^{II}: (\quad , \quad)$ $H^{II}: (\quad , \quad)$ $I^{II}: (\quad , \quad)$ $J^{II}: (\quad , \quad)$ Answers will vary.
		$G^{III}: (\quad , \quad)$ $H^{III}: (\quad , \quad)$ $I^{III}: (\quad , \quad)$ $J^{III}: (\quad , \quad)$ Answers will vary.
		$G^{IV}: (\quad , \quad)$ $H^{IV}: (\quad , \quad)$ $I^{IV}: (\quad , \quad)$ $J^{IV}: (\quad , \quad)$ Answers will vary.

Observations:

[Student answers will vary.]

Using what you have noticed in this activity, what general statements can you provide about reflections? Provide at least three statements.

- [Student answers will vary. Sample answers: lengths of segments remain the same, if reflection over the x-axis, $(x,y) \rightarrow (x,-y)$, etc.]*
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