UNIT 9 · STANDARD 6.NS.6B

# Reflect Points Across Axes

Lesson 9-7

Name: _____ Date: _____ Class: _____

## Key Vocabulary

Level 1 support

Picture first, then the word, then a plain-language meaning. Say each word out loud.

*(3, 2) reflected over the y-axis becomes (-3, 2) — x changes sign, y stays*

**Reflection**

A flipped image of a point on the other side of a line, the same distance away.

*(4, 3) → (4, -3): the y flips from +3 to -3, like folding the paper along the horizontal line*

**x-axis**

The line that goes across the grid. Flipping over it changes the y sign.

*(4, 3) → (-4, 3): the x flips from +4 to -4, like folding the paper along the vertical line*

**y-axis**

The line that goes up the grid. Flipping over it changes the x sign.

*A butterfly's wings are symmetric — fold it down the middle and both sides match*

**Symmetry**

When a shape looks the same on both sides of a line.

*..., -3, -2, -1, 0, 1, 2, 3, ...*

**Integer**

Whole numbers and their opposites, like -2, -1, 0, 1, 2.

## Key Ideas & Notes

- Captain Vega discovers that her treasure map has a magic mirror trick!
- When she folds the map along the x-axis, some clues match up perfectly with clues on the other side.
- For example, a marker at (2, 4) has a matching marker at (2, -4) when reflected over the x-axis.
- Another pair reflects over the y-axis: (5, 3) and (-5, 3).
- Plot each original point and then plot its reflection across the given axis.

### Think About It

- When (2, 4) reflects over the x-axis to (2, -4), which coordinate changed?
- When (5, 3) reflects over the y-axis to (-5, 3), which coordinate changed?
- What stays the same in each reflection?

**My Notes**

## Guided Examples

### Example 1

**What is the reflection of (4, -3) over the x-axis?**

**Solution:** Reflecting over the x-axis changes the sign of the y-coordinate. The x stays the same (4), and the y changes from -3 to 3. The answer is (4, 3).

**Answer:** B. (4, 3)

### Example 2

**What is the reflection of (-2, 6) over the y-axis?**

**Solution:** Reflecting over the y-axis changes the sign of the x-coordinate. x goes from -2 to 2, and y stays 6. The answer is (2, 6).

**Answer:** A. (2, 6)

### Example 3

**Which point is on the y-axis?**

**Solution:** Points on the y-axis have x-coordinate = 0. (0, 5) is on the y-axis.

**Answer:** A. (0, 5)

## Write About the Math

The Writing Revolution

I can explain my work using the words reflection, x-axis, y-axis, and symmetry.

### 1. Kernel Sentence

subject + verb

**Model:** Reflection is a flipped image of a point on the other side of a line, the same distance away.
*Reflexión es una imagen volteada de un punto al otro lado de una línea, a la misma distancia.*

**Write a kernel sentence about reflection. Use a subject and a verb.**
*Escribe una oración base sobre reflexión. Usa un sujeto y un verbo.*

### 2. Sentence Expansion

because · but · so

**Kernel:** Reflection matters in math
*Reflexión importa en matemáticas*

Expand the kernel three ways. Add a reason, a contrast, and a result.

| | |
|---|---|
| **because** *porque* | **Reflection matters in math because ____.** *Reflexión importa en matemáticas porque ____.* |
| **but** *pero* | **Reflection matters in math, but ____.** *Reflexión importa en matemáticas, pero ____.* |
| **so** *entonces* | **Reflection matters in math, so ____.** *Reflexión importa en matemáticas, entonces ____.* |

## 3. Sentence Types

**4 ways to write a math idea**

**Statement**
***Afirmación***

Tell one true fact about reflection.
*Di un hecho verdadero sobre reflection.*

**Reflection ____.**

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**Question**
***Pregunta***

Ask a question about reflection.
*Haz una pregunta sobre reflection.*

**How does ____ ?**
*¿Cómo ____ ?*

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**Exclamation**
***Exclamación***

Show excitement about reflection.
*Muestra entusiasmo sobre reflection.*

**Wow, ____ !**
*¡Guau, ____ !*

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**Command**
***Mandato***

Tell a partner what to do with reflection.
*Dile a un compañero qué hacer con reflection.*

**First, ____ .**
*Primero, ____ .*

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## 4. Explain Your Reasoning

**use a sentence starter**

**When I reflect across the ____ axis, ____ changes.**
*Al reflejar sobre el eje ____, cambia ____.*

**The new point is ____.**
*El punto nuevo es ____.*

**I see reflections in ____.**
*Veo reflexiones en ____.*

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## Try It

Solve on your own. Check the answer key when you are done.

**1. Which point is on the y-axis?**

A. (0, 5)

B. (5, 0)

C. (3, 3)

D. (-2, 4)

Show your work:

**2. Point A is at (-3, 5). It is reflected over the x-axis to A', then A' is reflected over the y-axis to A''. What are the coordinates of A''?**

A. (3, -5)

B. (-3, -5)

C. (3, 5)

D. (-3, 5)

Show your work:

### Stretch Your Thinking

Level 2 enrichment

Challenge task — explain your reasoning in full sentences.

**A triangle has vertices at A(1, 2), B(4, 2), and C(4, 6). If you reflect the entire triangle over the y-axis, what are the new vertices? What do you notice about the size and shape of the reflected triangle compared to the original?**

*Sentence starter: The reflected vertices are A'(____), B'(____), C'(____). I found each by ____. The reflected triangle is ____ compared to the original because reflections ____.*

Show your work:

## Reflect — Exit Ticket

**What is the reflection of (-5, 2) over the y-axis?**

A. (-5, -2)

B. (5, -2)

C. (5, 2)

D. (2, -5)

Your answer:

## Answer Key & Teacher Guide

1. **Try It 1:** A. (0, 5) — *Points on the y-axis have x-coordinate = 0. (0, 5) is on the y-axis.*
2. **Try It 2:** A. (3, -5) — *Over x-axis: (-3, 5) → (-3, -5). Then over y-axis: (-3, -5) → (3, -5). Both coordinates changed sign.*
3. **Exit Ticket:** C. (5, 2) — *Reflecting over the y-axis changes the sign of the x-coordinate. x goes from -5 to 5, and y stays 2. The reflection is (5, 2).*

### Writing (TWR) — what to look for

- **Kernel sentence:** A complete sentence needs a subject and a verb. Example: Reflection is a flipped image of a point on the other side of a line, the same distance away.
- **Expansion:** *because* gives a reason, *but* shows a contrast or exception, *so* shows a result. Answers vary; each must keep the kernel idea and add the correct kind of detail.
- **Sentence types:** Statement ends with a period, question with "?", exclamation with "!", and a command starts with an action verb (a "bossy" verb).