Distance on the Coordinate Plane

Lesson 9-6

Name: _____ Date: _____ Class: _____

Key Vocabulary

Level 1 support

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

The distance from -3 to 4 on a number line is |-3| + |4| = 3 + 4 = 7 units

Distance

How far apart two points are. It is never negative.

|-3| = 3 and |4| = 4; to find distance: |4 - (-3)| = 7

Absolute value

How far a number is from zero.

From (-2, 3) to (5, 3): count from -2 to 5 = 7 units across

Horizontal distance

How far apart two points are going left or right.

From (4, -1) to (4, 6): count from -1 to 6 = 7 units up

Vertical distance

How far apart two points are going up or down.

Two number lines crossing at (0, 0), creating four quadrants

Coordinate plane

A grid with a line going across and a line going up that cross.

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

Integer

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

Key Ideas & Notes

- Captain Vega has two treasure locations on her map: a buried chest at (-3, 2) and a hidden cave at (4, 2).
- Both are at the same height (y = 2) on the map.
- She needs to figure out how far apart they are so she knows how much rope to bring.
- Another pair of treasures is at (1, -3) and (1, 5) — same column, different rows.
- Plot each pair of treasure locations and find the distance between them.

Think About It

- What do the two points (-3, 2) and (4, 2) have in common?
- How can you count the distance between points in the same row?
- How does absolute value help when one point has a negative coordinate?

My Notes

Guided Examples

Example 1

What is the distance between (-4, 3) and (2, 3)?

Solution: Both points have y = 3, so this is a horizontal distance. |2 - (-4)| = |2 + 4| = 6 units.

Answer: C. 6 units

Example 2

What is the distance between (5, -2) and (5, 4)?

Solution: Both points have x = 5, so this is a vertical distance. |4 - (-2)| = |4 + 2| = 6 units.

Answer: C. 6 units

Example 3

A rectangle has vertices at (1, 1), (5, 1), (5, 4), (1, 4). What is its perimeter?

Solution: Width = 5 - 1 = 4. Height = 4 - 1 = 3. Perimeter = 2(4 + 3) = 14.

Answer: A. 14 units

Write About the Math

The Writing Revolution

I can explain my work using the words distance, absolute value, horizontal distance, and vertical distance.

1. Kernel Sentence

subject + verb

Model: Distance is how far apart two points are. It is never negative.
Distancia es qué tan separados están dos puntos. Nunca es negativo.

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

2. Sentence Expansion

because · but · so

Kernel: Distance matters in math
Distancia importa en matemáticas

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

because *porque*

Distance matters in math because ____.
Distancia importa en matemáticas porque ____.

but *pero*

Distance matters in math, but ____.
Distancia importa en matemáticas, pero ____.

so *entonces*

Distance matters in math, so ____.
Distancia importa en matemáticas, entonces ____.

3. Sentence Types

4 ways to write a math idea

Statement
Afirmación

Tell one true fact about distance.
Di un hecho verdadero sobre distance.

Distance ____.

Question
Pregunta

Ask a question about distance.
Haz una pregunta sobre distance.

How does ____ ?
¿Cómo ____ ?

Exclamation
Exclamación

Show excitement about distance.
Muestra entusiasmo sobre distance.

Wow, ____ !
¡Guau, ____ !

Command
Mandato

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

First, ____ .
Primero, ____ .

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4. Explain Your Reasoning

use a sentence starter

I subtracted / counted ____.
Resté / conté ____.

The distance is ____ units.
La distancia es ____ unidades.

I would measure distance to ____.
Mediría la distancia para ____.

Try It

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

1. A rectangle has vertices at (1, 1), (5, 1), (5, 4), (1, 4). What is its perimeter?

A. 14 units

B. 12 units

C. 20 units

D. 8 units

Show your work:

2. Two points are at (-3, -7) and (-3, 5). What is the distance between them?

A. 12 units

B. 2 units

C. 7 units

D. 8 units

Show your work:

Stretch Your Thinking

Level 2 enrichment

Challenge task — explain your reasoning in full sentences.

A rectangle has vertices at (-4, -2), (3, -2), (3, 5), and (-4, 5). Find the length, width, perimeter, and area of the rectangle. Show your work using absolute value.

Sentence starter: The width is |____ - (____)| = ____ units. The height is |____ - (____)| = ____ units. The perimeter is 2(____ + ____) = ____ units. The area is ____ × ____ = ____ square units.

Show your work:

Reflect — Exit Ticket

What is the distance between the points (3, -2) and (3, 5)?

A. 3 units

B. 5 units

C. 7 units

D. 9 units

Your answer:

Answer Key & Teacher Guide

1. **Try It 1:** A. 14 units — *Width = 5 - 1 = 4. Height = 4 - 1 = 3. Perimeter = 2(4 + 3) = 14.*
2. **Try It 2:** A. 12 units — *Same x = -3. Distance = |5 - (-7)| = |5 + 7| = 12 units.*
3. **Exit Ticket:** C. 7 units — *Both points share x = 3, so this is a vertical distance. |5 - (-2)| = |5 + 2| = 7 units.*

Writing (TWR) — what to look for

- **Kernel sentence:** A complete sentence needs a subject and a verb. Example: Distance is how far apart two points are. It is never negative.
- **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).