

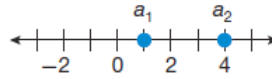
Geometry Lesson 9

Objective: TSW use the distance formula to find the length of a segment.

Often, the length of a segment can be measured using a _____. At other times, may be necessary to find length by looking at a number line or a coordinate plane.

To find the distance between two points on a number line, take the absolute value of the difference between those points' coordinates.

The distance between points a_1 and a_2 is $|4 - 1| = 3$.



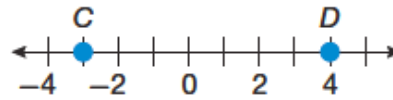
Hint

An absolute value is used to determine distance and length because it is impossible for something to have a negative length, or for the distance between two points to be negative.

Example 1 Distance Between Two Points on a Line

Find the distance between the points on the number line.

SOLUTION



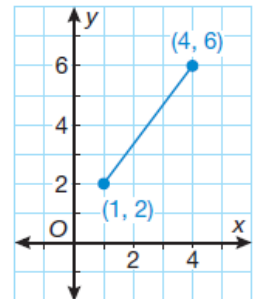
On a coordinate plane, the distance between two points can be found using the distance formula.

Distance Formula - In a coordinate plane, the distance d between two points (x_1, y_1) and (x_2, y_2) is given by the formula

Example 2 Using the Distance Formula

Find the distance between the two points.

SOLUTION



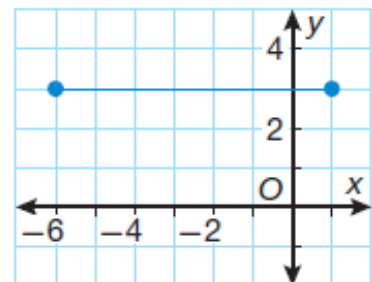
It does not matter which ordered pair is chosen to be (x_1, y_1) . It is important, however, that x_1 and y_1 come from the same ordered pair.

When two points share the _____ x-value or y-value, the distance formula can be simplified as shown in the next example.

Example 3 Distance Between Points That Share One Coordinate

Find the distance between the two points.

SOLUTION



The square root and the square cancel, so with the two identical y -values, the distance formula becomes:

Math Reasoning

Verify Since the diagram shows a horizontal line, an easy way to verify the result of the distance formula is to simply count the number of unit squares the line crosses. Would the result be any different if you flipped the x and y coordinates of these points?

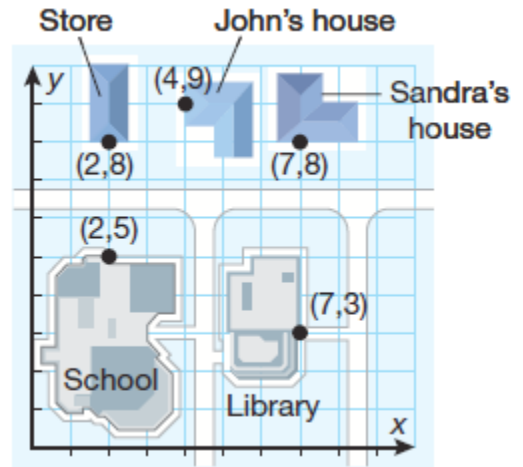
Example 4 Application: Navigation

Use the following map for each question.

The distance is measured from the dot on each building.

a. What is the distance from John's house to the school if each unit on the coordinate plane represents 100 meters?

SOLUTION



b. What is the distance from Sandra's house to the store?

SOLUTION

You Try!!!!

b. What is the distance between points S and T ? Round to the nearest hundredth.

c. Find the distance between the points $(2, 3)$ and $(2, -4)$.

