Lesson 13

Strategy Focus
Draw a Diagram

MATH FOCUS: Coordinate Plane

Learn

Read the Problem

> The library in Alima's neighborhood is 3 blocks east and 3 blocks north from her home. Her school is 4 blocks to the west of her home. When Alima walks 3 blocks east and 2 blocks south of her home, she reaches a store. Her aunt's home is 3 blocks west and 4 blocks south of her home. Make a map of her neighborhood. How many blocks is the library from the store?

Reread Ask yourself questions as you reread the problem.

- What is described in the problem?

_____

- What kind of information does the problem provide?

_____

- What am I being asked to do?

_____

Search for Information

Read the problem again. Mark the information that describes how to get to each place from Alima's home.

Record Write how to get to each place from Alima's home.

The library is _____.

The school is _____.

The store is _____.

Her aunt's home is _____.

You can use this information to solve the problem.

Decide What to Do

You know how to get to four places from Alima's home.

Ask How can I show all of these places?

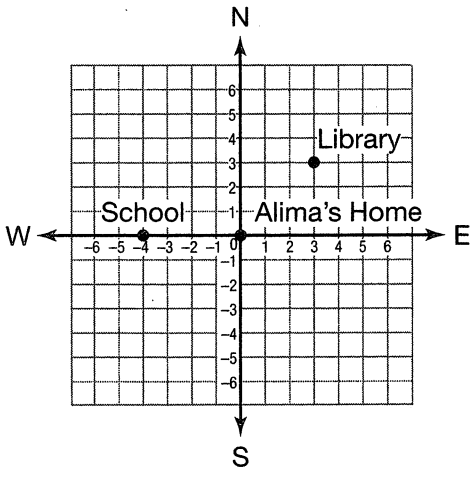
- I can use the strategy *Draw a Diagram* on a coordinate plane.
- I can show the locations of Alima's home and the four other places. Then I can find the distance between the library and the store.

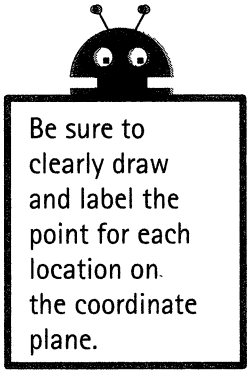
Use Your Ideas

Step 1 Label the directions N, S, E, and W.

Step 2 Use the origin (0, 0) as "Alima's Home." The length of each side of each square stands for 1 block.

Step 3 Three of five points are already on the coordinate plane. Draw and label the last two points. Start from Alima's home each time.





Step 4 Count the number of blocks between the library and the store.

There are _____ blocks between the library and the store.

So the library is _____ from the store.

Review Your Work

Check that you found each location by starting from Alima's home.

Explain How does writing the directions N, S, E, and W on the coordinate plane help you solve the problem?

_____

_____

Try

Solve the problem.

1. Sam is at Drew's home. Drew's home is 2 miles south of Sam's home. Sam starts at Drew's home and bikes 3 miles east to the library to return a book. He then bikes 5 miles north to reach the pool. If Sam could bike in a straight line from the pool to his home, in which direction would he go?

Mark the Text

Read the Problem and Search for Information

Visualize the problem as you read so you understand the situation.

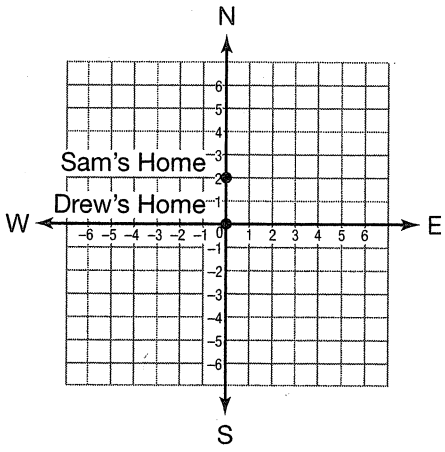
Ask Yourself

How can I use the information in the problem to make a map?

Decide What to Do and Use Your Ideas

You can use the strategy *Draw a Diagram* to make a map.

Step 1 The length of each side of each square stands for 1 mile. Draw and label points to show the locations of the library and the pool.



Step 2 Write the coordinates of each place. Sam's home is at (0, 2). Drew's home is at (0, 0).

The library is at _____. The pool is at _____.

Step 3 Sam's home is 3 miles west and 3 miles south from the pool. If Sam could travel in a straight line, the directions he would need to travel would be a combination of _____ and _____ to get home.

So Sam would go _____.

Review Your Work

Be sure you started Sam's trip to the library from Drew's home.

Determine How does using a map help you answer this question?

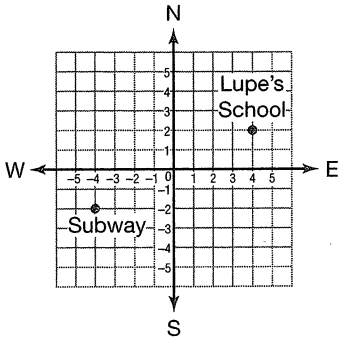
_____

_____

Apply

Solve the problems.

2 Lupe is at school. She needs to reach the subway. Each side of each square on the map represents 1 block. If she walks 4 blocks south, in which direction will Lupe need to walk to reach the subway? How many blocks will she walk?



Label the spot where Lupe will be after she walks 4 blocks south from the school as "Lupe."

Compare this spot to where the subway is.

Ask Yourself

What are the different directions Lupe walks, and in what order?

Hint Start at the school. Then follow the directions.

Answer _____

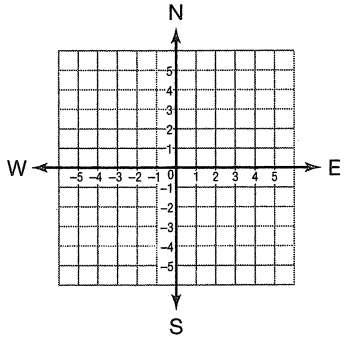
Compare How does the diagram help you know which direction Lupe will need to walk after she walks 4 blocks south from the school?

_____

_____

3 A forest ranger is making a map of a forest. The length of each side of each square represents 1 kilometer. The Miner's Cabin is at $(-3, -4)$ on the map. The Old Well is at (3, 5). What is the shortest distance the ranger can walk from the Old Well to the Miner's Cabin if he can only walk north, south, east, and west?

Plot the ordered pair $(-3, -4)$ and label it "Miner's Cabin." Plot (3, 5) and label it "Old Well."



The distance west from 3 to -3 is _____ kilometers.

The distance south from 5 to -4 is _____ kilometers.

Ask Yourself

At which location is the ranger starting the walk?

Hint Be sure to draw and label each point.

Answer _____

Appraise Suppose the ranger wants to show the location of a place 5 kilometers east and 7 kilometers south of the Miner's Cabin. Can the ranger show the location with this map? Explain.

_____

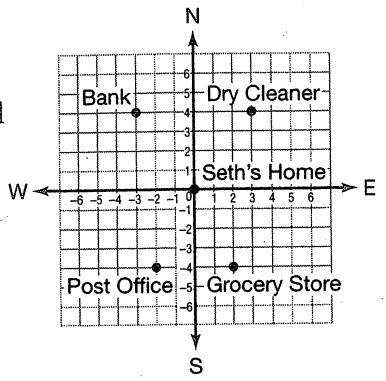
_____

Hint When you find each location Seth could have stopped at, circle it.

Ask Yourself

Am I moving in the correct directions on the coordinate plane?

4 Seth ran two errands. From his home, he walked 3 blocks west and 4 blocks north. From there, he walked 8 blocks south and 5 blocks east without stopping. Then he walked 4 blocks north and 2 blocks west back home. At which two places could Seth have stopped before he got home? How many blocks did he walk in all?



Draw arrows to show the path that Seth takes from his home.

Answer _____

Analyze Is there a shorter route Seth could have taken to make his two errands? Explain.

_____

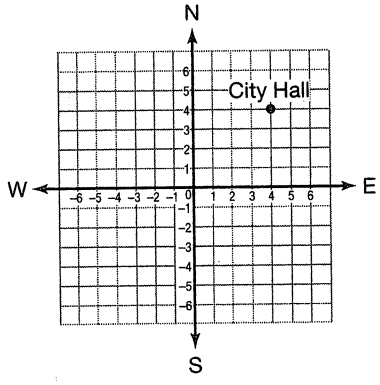
_____

Hint Be sure to double-check your directions when you plot your points.

Ask Yourself

What location am I already given?

5 Mandy is making a model of a city for an art project. The cinema is 3 units east of the burger place. The burger place is 8 units south of the park. The park is 7 units west of City Hall. City Hall is at (4, 4). What is the shortest path along the grid lines a person could walk from the cinema to City Hall?



Plot and label these places on the map.

Answer _____

Interpret Mandy's model describes distance in *units*. How could Mandy help people figure out the real distances the model represents?

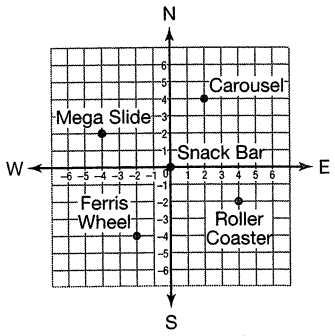
_____

_____

Practice

Solve the problems. Show your work.

6 Damon is at a fair. The map shows the locations of four attractions. From the snack bar, Damon walks to $(-4, 2)$. He then walks to $(4, -2)$. From there he walks to $(-2, -4)$, and finally he walks to $(2, 4)$. In which order did Damon visit the attractions?



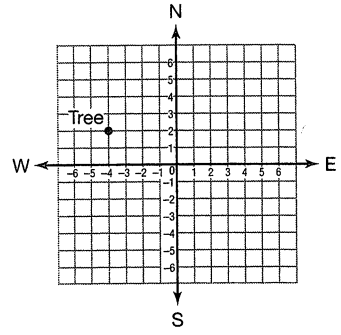
Answer _____

Infer How does a diagram help you solve problems like this one?

_____

_____

7 Haru is making a treasure map. From the tree, she will first walk 6 units south and 7 units east to a large rock. From the large rock, she will walk 4 units north and bury the treasure. Walking along the grid lines, what is the shortest path Haru could take to go back from the treasure to the tree?



Answer _____

Formulate What is another question you could ask about this map?

_____

_____

Create

Make a simple map of your classroom. Use points to show four different objects. Include your desk as one of the points. Write and solve a problem using the strategy *Draw a Diagram.*