



## 3.1 Position on the Coordinate Plane

### READ



To describe any location in two dimensions, we use a grid called the **coordinate plane**. You can describe any **position** on the coordinate plane using two numbers called **coordinates**, which are shown in the form of  $(x, y)$ . These coordinates are compared to a fixed reference point called the **origin**. The table below describes the  $x$  and  $y$  coordinates:

Coordinate	Which axis is it on?	Which is the positive direction?	Which is the negative direction?
$x$	horizontal, called the $x$ -axis	right or east	left or west
$y$	vertical, called the $y$ -axis	up or north	down or south

### EXAMPLE



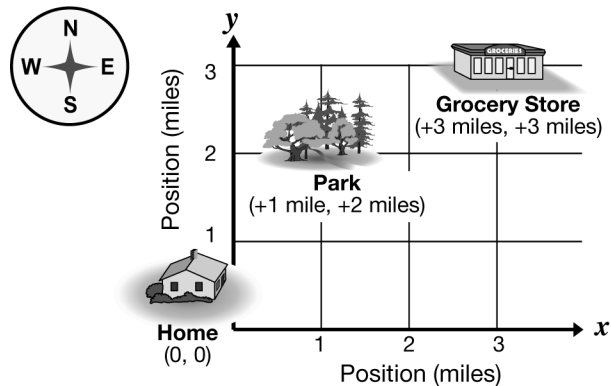
Your home is at the origin, and a park is located 2 miles north and 1 mile east of your home.

- Show your home and the park on a coordinate plane, and give the coordinates for each.
- After you go to the park, you drive 2 miles east and 1 mile north to the grocery store. What are the coordinates of the grocery store?

### Solution

If your home is at the origin, it is given the coordinates  $(0, 0)$ . By counting over 1 box from the origin in the positive  $x$ -direction and up 2 boxes in the positive  $y$ -direction, you can place the park on the coordinate plane. The park's coordinates are  $(+1 \text{ mile}, +2 \text{ miles})$ .

From the park, count over 2 more boxes in the positive  $x$ -direction and up one more 1 box in the positive  $y$ -direction to place the grocery store. That makes the grocery store's coordinates  $(+3 \text{ miles}, +3 \text{ miles})$ .



### PRACTICE



1. You are given directions to a friend's house from your school. They read: "Go east one block, turn north and go 4 blocks, turn west and go 1 block, then go south for 2 blocks." Using your school as the origin, draw a map of these directions on a coordinate plane. What are the coordinates of your friend's house?
2. A dog starts chasing a squirrel at the origin of a coordinate plane. He runs 20 meters east, then 10 meters north and stops to scratch. Then he runs 10 meters west and 10 meters north, where the squirrel climbs a tree and gets away.
  - a. Draw the coordinate plane and trace the path the dog took in chasing the squirrel.
  - b. Show where the dog scratched and where the squirrel escaped, and give coordinates for each.
3. Does the order of the coordinates matter? Is the coordinate  $(2, 3)$  the same as the coordinate  $(3, 2)$ ? Explain and draw your answer on a coordinate plane.