Application

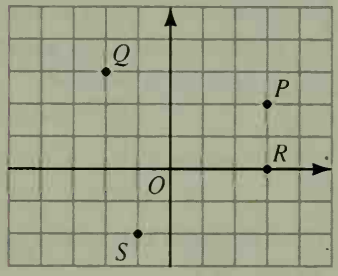
Locating Points

Suppose you lived in an area with streets laid out on a grid. If you lived in a house located at point P in the diagram at the right below, you could tell someone where you lived by saying:

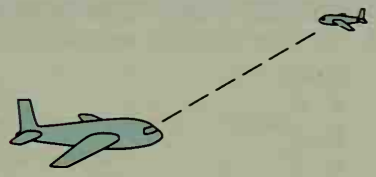
> From the crossing at the center of town, go three blocks east and two blocks north.

A friend of yours living at Q might say she lives two blocks west and three blocks north of the town center.

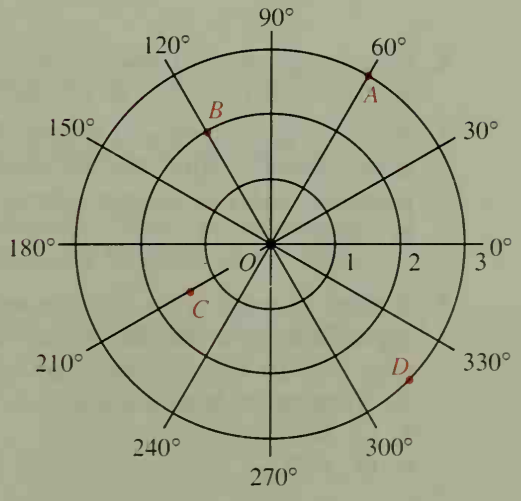
Mathematicians make such descriptions shorter by using a grid system and *coordinates*. They use (3, 2) for your house at point P, and $(-2, 3)$ for your friend's house at Q. Point O at the center of town is (0, 0). Points R and S are (3, 0) and $(-1, -2)$.



This grid system is not always the easiest way to describe a position. If you were a pilot and saw another airplane while flying, it would be difficult to give its position in this system. However, you might say the other plane is 4 km away at 11 o'clock, with 12 o'clock being straight ahead.



Mathematicians sometimes find it convenient to describe a point by a distance and an angle. Rotation in a clockwise direction is represented by a negative angle. Counterclockwise rotation is represented by a positive angle. A complete rotation, all the way around once, is 360° (or $-360°$). The labeled points in the diagram at the right are described as shown below.



A	(3, 60°)
B	(2, 120°)
C	(1.5, 210°) or (1.5, $-150°$)
D	(3, 315°) or (3, $-45°$)