

Grade 8 Mathematics

Geometry: Lesson 6

Read aloud to the students the material that is printed in **boldface type** inside the boxes. Information in regular type inside the boxes and all information outside the boxes should **not** be read to students. Possible student responses are included in parentheses after the questions.

NOTE: The directions read to students may depend on the available materials. Read only those parts of the lesson that apply to the materials you are using.

Any directions that ask you to do something, such as to turn to a page or to hand out materials to students, will have an arrow symbol (\Rightarrow) by them.

Purpose of Lesson 3:

- In this lesson, the tutor and the students will
 - ✓ locate points on a coordinate plane given its coordinates,
 - ✓ identify the coordinate of a point on a coordinate graph, and
 - ✓ graph ordered pairs in all 4 quadrants.

Equipment/Materials Needed:

- Student Sheets 42 – 44
- A map of any state (optional)

Preparations before beginning Lesson 3:

- Run off one copy of Student Sheets 42 – 44 for each student.
- Have paper and pencils available.
- Get a map if you are going to use it.

Lesson 3: Geometry

Say:

Many maps use a system of letters and numbers to help you locate cities and towns on the map.

⇒ Give students a copy of Student Sheet 42. If you have a map available, shown them that maps **do** use the letter and number system.

Say:

Look at the map at the top this page. The letters on the side and the numbers on the top of the map help us locate cities. I could say that Shreveport is located in the square named C2 or 2C. It doesn't matter which we say first: the letter or the number. Where is New Iberia located on this map? (L8 or 8L) Which city is located in J12? (Ponchatoula)

The number and letter system used by maps is an example of a *coordinate system*. A *coordinate system* is a way of using two or more numbers or letters to show or locate a point in space. Each number or letter used is called a *coordinate*.

Look at the coordinate plane at the bottom of this sheet. How is it similar to the map above? (It uses a grid and two coordinates.) How is it different? (The coordinate plane uses two sets of numbers and the map uses numbers and letters. The numbers are at the top of the map; they are at the bottom of the grid. The horizontal axis is labeled as x and the vertical is labeled as y on the grid.)

The coordinate system that we are going to look at today uses two numbers instead of letters and numbers. Because the two coordinates are both numbers, we have to know which coordinate to name first. We will name the number on the horizontal axis, or the x -axis, first and the number on the vertical axis, or y -axis, second. Because the order matters, we will call it an *ordered pair*. Look at point M on the graph. The x -coordinate is 4; the y -coordinate is 6. To write the x and y coordinates as an ordered pair, we put a comma and a space between the two numbers and put them in parentheses. So we write M as (4, 6). Is (4, 6) the same point as (6, 4)? (No) Mark (6, 4) on the coordinate plane.

⇒ Give students a copy of Student Sheet 43.

Say:

On Coordinate Plane A, some points have been plotted. To plot a point means to use coordinates to find the location of the point. Write ordered pairs for each point plotted. Write the points on the board.

Answers:

A. (11, 12) B. (5, 5) C. (2, 13) D. (9, 0)
E. (0, 6) F. (13, 2) G. (0, 0)

(0, 0) is a special point. It is called the *origin* of the coordinate plane.

On Coordinate Plane B, plot the following points. Label the points with the capital letters.

A. (1, 2) B. (2, 1) C. (2, 4) D. (6, 3)
E. (14, 14) F. (0, 5) G. (5, 0) H. (0, 10)

⇒ Give students a copy of Student Sheet 44.

Say:

On the coordinate planes that we have been using, we have been looking at only positive values for x and y . We can also look at negative numbers. Look at Coordinate Plane C. The x -values to the right of the y -axis are positive, the x -values to the left of the y -axis are negative. Which points will have negative x -coordinates? (A, D) The y -values above the x -axis are positive; the y -values below the x -axis are negative. Which points will have negative y -coordinates? (A, C) Write the ordered pairs for each plotted point. Remember you still write the x -coordinate first. Answers:

A. (-3, -4) B. (0, 0) C. (3, -2) D. (-4, 2) E. (4, 4)

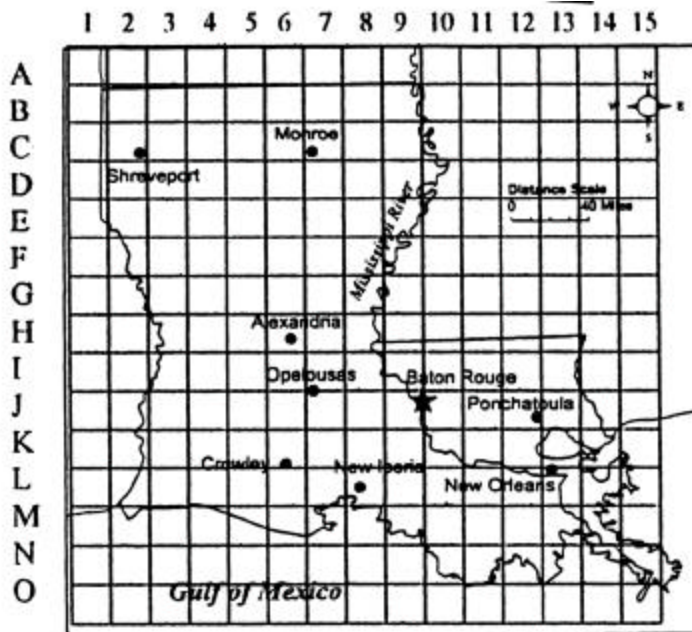
Say:

Look at the bottom half of Student Sheet 44. The table to the right of the grid is called a *T-table* or an *XY table*. This table is another way to show ordered pairs. We can plot these points on the coordinate plane. The first point would be (0, 1). What are the other points to plot? (2, 3), (5, 6), (-1, 0), (-3, -2). Plot the 5 points on the grid. If we connected the points, what would we get? (a straight line or segment)

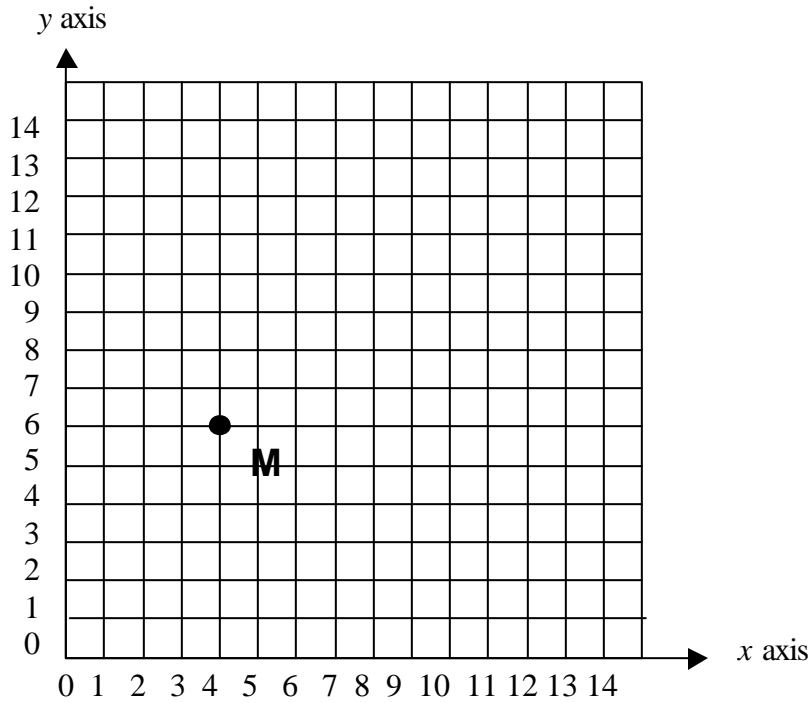
⇒ Have one student summarize today's lesson. Emphasize that the first coordinate in an ordered pair is the value for x and the second coordinate is the value for y .

Student Sheet 42 (Geometry: Lesson 6)

Map of Louisiana

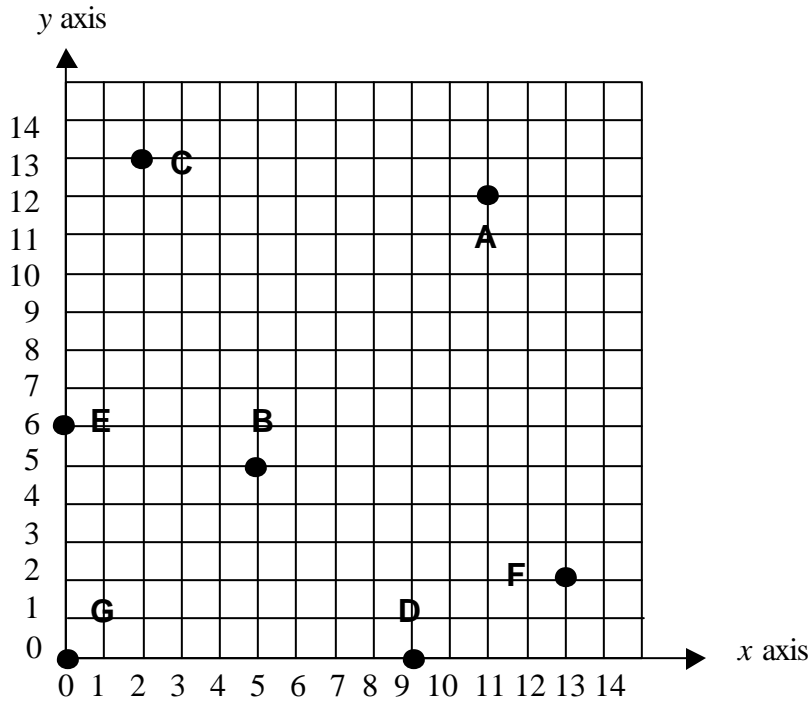


Coordinate Plane

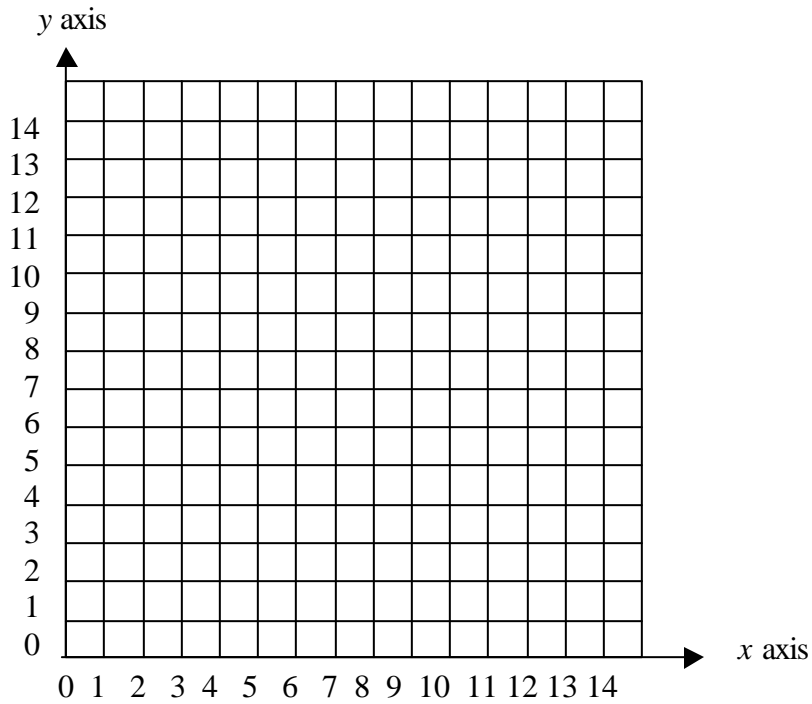


Student Sheet 43 (Geometry: Lesson 6)

Coordinate Plane A

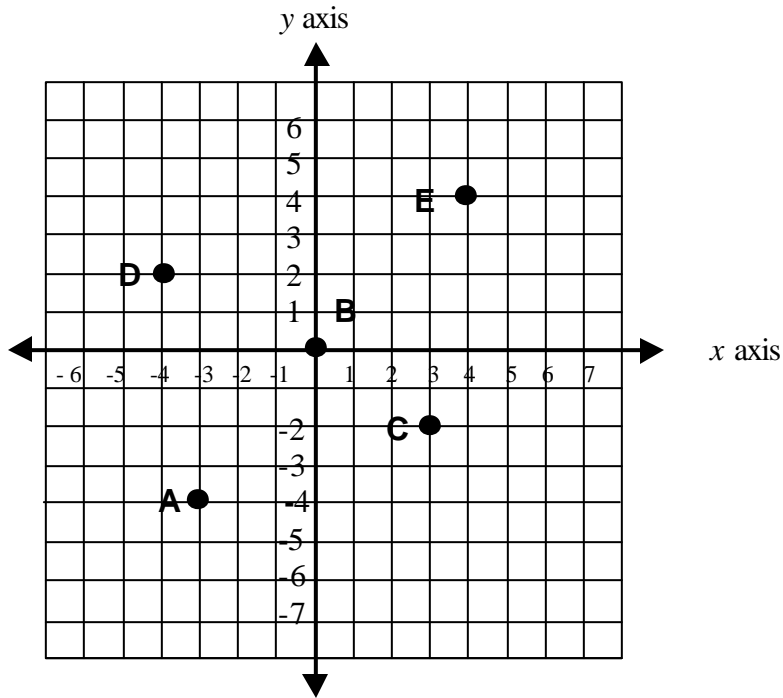


Coordinate Plane B

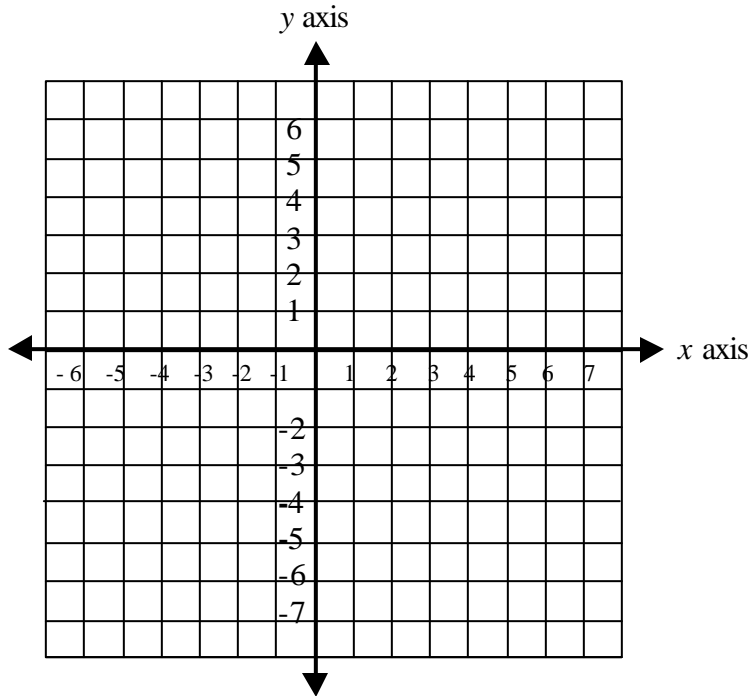


Student Sheet 44 (Geometry: Lesson 6)

Coordinate Plane C



Coordinate Plane D



x	y
0	1
2	3
5	6
-1	0
-3	-2