Coordinate Plane

STRAND: Measurement and Geometry

STRAND CONCEPT: Coordinate Plane and Transformations

SOL 6.8ab

Remediation Plan Summary

Students identify, and graph ordered pairs in the four quadrants of a coordinate plane

Common Errors and Misconceptions

Students may confuse the "*x*" and "*y*" coordinates as well as the x and y axis.

Materials

- Graph paper
- "City Map" handouts
- "Coordinate Plane Practice" handout
- Exit Ticket

Introductory Activity

Draw a number line on the board and label the zero point. Ask students to copy it onto a piece of graph paper, and then ask them to add the points 4, 6, −7, 2, −1, 8, −4. When everyone has completed their own line, have students share their work. Tell the students that this number line is like the *x*-axis of a coordinate plane.
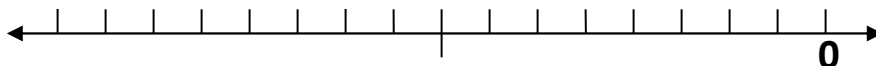

Plan for Instruction

- Distribute a copy of the "City Map" handout to each student. Compare the coordinate plane to the city map: the *x*-axis and *y*-axis are like the two main city streets, and the point where these two main streets cross is the origin. Ask students to find the two main city streets on the map (Main Street and Palm Blvd.) Have students describe the location of each building by using the names of the intersecting streets on which each is found—the street that runs horizontally first and then the street that runs vertically. (Library: Oak Street and Maple Street; Church: Elm Street and Pine Street: Pharmacy: Main Street and Palm Blvd.)
- Explain that just as a place on the map can be located by looking for the intersection of two streets, a point on a coordinate plane can be located by finding the intersection of two lines. The horizontal lines on a coordinate plane are numbered using positive numbers from the origin to the right and negative numbers from the origin to the left. The vertical lines are numbered using positive numbers from the origin up and negative

numbers from the origin down. Notice that each axis has arrows on both ends to show that they continue into infinity. The horizontal line is called the *x*-axis and the vertical line is called the *y*-axis. Discuss these points with the students while drawing a coordinate plane on large graph paper or a graph displayed to the whole class. Have each student draw a coordinate plane on graph paper and label.

- Inform students that a point located on a coordinate plane is written as a pair of numbers called *ordered pairs.* The first number of the pair is the *x*-coordinate and is found on the *x*-axis; the second number of the pair is the *y*-coordinate and is found on the *y*-axis. Ordered pairs are written in parentheses separated by a comma. For example, if you are asked to locate the ordered pair (2, 5), you would start at the origin and move 2 spaces to the right on the *x*-axis and then 5 spaces up. The intersection would be labeled with a letter, A, to represent the location of ordered pair (2, 5). You would say that ordered pair (2, 5) is at point A (see coordinate plane on previous page). Discuss with students that order matters when creating an ordered pair. For example (2, 5) is not the same point as (5, 2). Let students practice by labeling any 3 coordinates of their own on their graphs. Allow time for students to share these on your display graph.

- Point out that the *x*-axis and *y*-axis divide the coordinate plane into four sections called *quadrants.* These quadrants are numbered counterclockwise from I to IV, using Roman numerals and beginning in the upper right quadrant.

- Have students number the quadrants on their coordinate planes. Ask students to identify any 3 coordinates in each quadrant I, II and III and show them on their graphs. Have a few students (at least 3) place their points for quadrant II on the display graph. Ask the class what they notice about all of the points. (All have an *x*-coordinate that is negative and a *y*- coordinate that is positive.) Repeat for quadrants I and III. For quadrant IV, ask the students to predict what the pattern will be. Discuss.

- Give students random coordinates such as (2, -4) and ask them to predict in which quadrant the point will lie.

- Distribute the "Coordinate Plane Practice" worksheet, and have students complete.
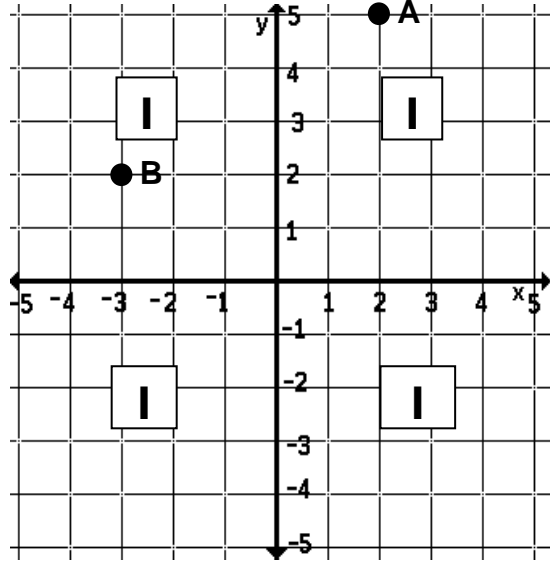
Pulling It All Together (Reflection)

Exit Ticket
Part I
- Have students describe in writing how locating a point on the coordinate plane is like locating a building on a city map.

Part II
- Have students describe in writing how to plot the point (-7, 3) on the coordinate plane to a 5th grader.

Note: The following pages are intended for classroom use for students as a visual aid to learning.
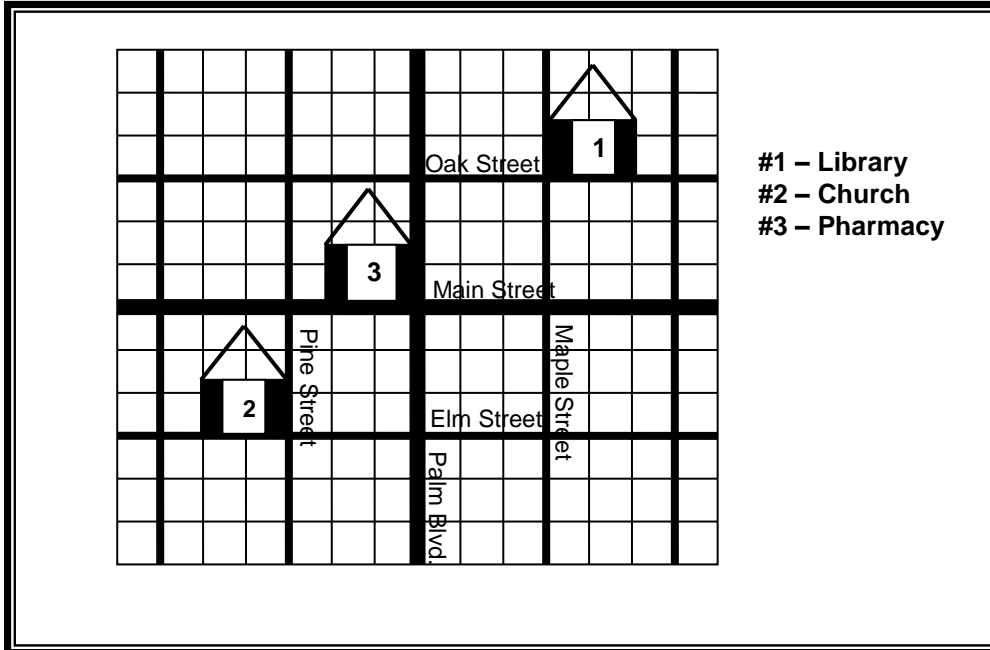
Name: _____

Exit Ticket

Part I

Have students describe in writing how locating a point on the coordinate plane is like e finding a building on a city map.

Part II

Have students describe in writing how to plot the point (-7, 3) on the coordinate plane to a 5th grader.

Name:

City Map

#1 – Library
#2 – Church
#3 – Pharmacy

The library is located at the intersection of _____.

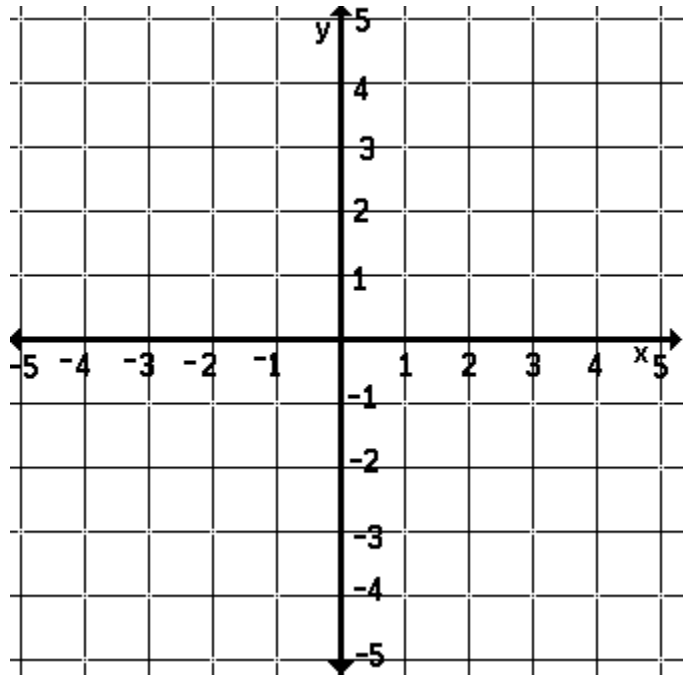The church is located at the intersection of _____.

The pharmacy is located at the intersection of _____.

Name:

Coordinate Plane Practice

Locate the following ordered pairs on the coordinate plane at right and label each point with the appropriate letter.

1. A (2, 3)

2. B (0, −2)

3. C (−2, 4)

4. D (0, 2)

5. E (5, −1)

6. H (−1, −4)

7. J (3, −3)

8. K (1, 0)

Use Roman numerals to name the quadrant in which each point is found. If a point is located on an axis, identify the axis on which it lies.

A _____

B _____

C _____

D _____

E _____

H _____

J _____

K _____